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Modern Libraries in New Normal

Management of
Modern Libraries in New Normal

Prof. M.P. Singh
Dr. Sharad Kumar Sonkar

CORVETTE PRESS

Management of Modern Libraries in New Normal

Prof. M.P. Singh and Dr. Sharad Kumar Sonkar

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First Published: 2022
ISBN: 978-93-91385-10-1

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CORVETTE PRESS
123, Ground Floor, Sector-3, Vasundhara,
Ghaziabad, Uttar Pradesh - 201012
Email: info.corvettepress@gmail.com
Mob.: 8810311911

Typeset by
GURPAL COMPUTERS, Delhi-110092

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(Accredited "A" Grade by NAAC)

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Vice-Chancellor, Kumaun University, Nainital

MESSAGE

I am delighted to know that the Society for Promotion of Library Professionals, Uttarakhand, and Society for Promotion of Libraries, Uttar Pradesh, have initiated a commemoration volume in memory of Dr. Suchetan Kumar, a dedicated Library Professional served in the DSB Campus Library, Kumaun University, Nainital for more than two decades and received laurels from the academics and LIS Professionals for his yeomen services and commitment to the profession.

Today's changing environment of information and communication technology has drastically designed different ways in which information is created, processed, disseminated and utilized. In the domain of higher education, the library occupies a very important role. It is essential for library professionals to prepare for next generation concerns in order to meet of the evolving information panorama.

Dr. Suchetan Kumar has made multi-dimensional contribution in the field of Library and Information Science. I am confident that this memorial volume is a great tribute to him. May his spirit find eternal rest.

I believe that this memorial volume will play vital role in enhancing capability of LIS Professionals and Practitioner. It will be also helpful to the researchers and budding LIS Professionals to make themselves competent with the changing scenario. I applaud the publication and this memorial volume will be a great addition to every library.

I congratulate the Editor and the Memorial Advisory Committee on this achievement and express my warmest greetings for the grand success of this academic venture.

(Prof. N. K. Joshi)
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Foreword

Books give a soul to the universe, wings to the mind, flight to the imagination, and life to everything

– Plato

Books support self-education and reading books builds the knowledge and mental capability of an individual. The value and popularity of any book depend on its contents, that is the subject matter and presentation style. Regarding subject books, the updated knowledge contained books attract more users. Generally, every book deals with a particular subject but an edited volume consists of articles on a variety of specific topics covering a broad subject and by several professionals. The present festschrift is a commemoration volume to Dr. Suchetan Kumar, Asst Librarian, Kumaon University and it has 49 contributed articles on both traditional and modern areas of LIS. The topics covered include collection development, management of e-resources, MOOCs, knowledge management, research publishing, big data, licensing issues of e-resources, etc.

I am impressed with the variety of themes covered in the volume and also with the contribution of scholarly and research papers by the LIS professionals representing all parts of the country. This is the reflection of the respect, and regard Dr. Suchetan Kumar of Kumaon University carries in the LIS professional circles and the healthy human relations that he maintained with his fellow professionals.

Dr. Suchetan was an ever-smiling person and friend of all. He was highly helpful and known for his professionalism and commitment to society. His services brought recognition not only to himself but to the LIS profession. Unfortunately, we lost him in the Covid pandemic. To remember and pay tributes, all his professional friends joined together to bring out the memorial volume. I have a lot of attachment to Dr. Suchetan and that made me the Chairman of the Memorial volume Committee.

With the varied themes of papers contributed by the experts in the LIS profession, this memorial volume will be of value to the professional librarians and the budding students of library science. Therefore, I consider the book will be a good addition to the LIS collection of any library.

18, April 2022 **Prof. N. Laxman Rao**

Preface

This Memorial volume, entitled Management of Modern Libraries in New Normal is dedicated to Dr. Suchetan Kumar, deserves such an honour in view of his significant contributions in LIS profession in various capacities such as: an author, researcher, teacher and a great friend of students during the tenure of his professional career.

The library is the pillar of any institution; every stream of knowledge is impossible without the existence of the library. Just as a body without a heart is of no use, in the same way, university is heartless without the library, so it can be said that the library gives a special contribution in filling the knowledge in any human being, such as how to acquire knowledge, keep it save and how to spread it. Libraries are striving to develop collections, resources, and services to meet cultural needs and services. The informational, educational, and recreational demands of its target users, as libraries primarily aim to meet the multiple needs of their target users. On the other hand, the advancement of Information and Communication Technology libraries has redefined its resources, operations, and services due to the change in demand for the users. Keep in mind the new normal era, it is necessary to change the library, if there is a change in the library, then its management will also change. Every person is connected to the internet in some way. Users want to get information with one click. At present, the libraries have different functions to perform Modern libraries depend on computers, communication, and other technical skills. The advent of modern technology in the services of libraries appeared as advantage during the covid-19, where physical contact of users was being avoided, at the other side libraries were providing services to users through the online medium.

This memorial volume is designed to bring out all information related to modern libraries, providing Information about Management, Leadership, Planning, Operation, and Monitoring of Modern Libraries in New Normal, Emerging Technologies and Sustainable Librarianship / future of librarianship, Open Access to Scholarly Communication and Open Science, Academic Integrity and Plagiarism, Digital Libraries and Institutional Repositories, Collection Development in Digital Era: Issue and Challenges, Data Mining and Knowledge Management, Social Media and Networking of libraries, Altmetrics, Webometrics, Scientometrics and Bibliometrics, Social Interaction and Information Literacy, Professional Ethics and Librarianship Responsibility, Role of Libraries in Institutional Ranking. This is not just an additional literature in the field but also provides emerging trends in the technology to enrich knowledge among library and information science professionals.

This volume plays a quintessential role in every professional's life by introducing them to a world of technology, providing knowledge of the emerging trends, improving their research productivity, connects users to modern libraries.

This book is like an umbrella which covers all the emerging trends. There are sincere efforts of the authors are visible through their articles in the volume. Out of which, most of the library professionals have expressed their talent in Altmatrics, webometrics, Scientometrics, Bibliometrics and on another hand, social interaction and information literacy have also been given importance by the professionals. I hope that with the help of this volume fulfill the need of the researchers, library professionals as well as students for their encouragement to take the profession at its highest position.

I express my special thanks to committee members who have given their best efforts to maintain the quality of papers and equally thanks to contributors for contributing their articles.

Lastly, I want to express my gratitude to M/s IBS, New Delhi, for bringing this volume abstract to life for the users. I hope that, this volume will be valuable to information seekers, particularly LIS professionals.

—Dr. M.P. Singh

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Suchetan Kumar: A Versatile and Committed Professional

Prof. M.P. Singh
Department of Library and Information Science
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(A Central University), Lucknow, India

Dr. Suchetan Sah (1976-2021)

In my knowledge Dr. Suchetan was born on 29th April 1976 in Nainital of Uttarakhand state. He was very bright student since his childhood, after completing his school study he graduated from Kumaun University, Nainital. Further he did PG, UGC-NET and Ph.D. in Library & Information Science. I wanted to share the glimpses of my personal experience with him in upcoming sections.

An Influential Personality

I know him since 2006 when we met at Bundelkhand University in department of Library and Information Science where he had come for admission in M.Lib.I.Sc. His personality was very influential and I also got influence with his personality from first day. He was a good learner, always passionate to learn new things. He came prepare for the lecture beforehand and had a great orator skill. Whenever discussion happened on any topic in classroom, he used to present it very seriously. When he had come for admission approx. 20 more students were along with him from Bareilly and whenever they faced any problem, he used to solve it personally and among them he was known as a person with good personality and leader with a compassionate heart ready to help others.

I remember him a person with multifaceted personality who was very committed towards his work and responsibility, he had good quality of leadership along with this he was very good human being. He was friendly by nature and mingled with people easily. My association with him was like family relation he treated me like an elder brother he was always present in

family functions in the same way he had invited me on many occasion in various capacity.

A Dedicated Library Professional

Dr. Suchetan Kumar, a dedicated library professional served in the Kumaun University library, Nainital more than decades and made their name among the academics and LIS professionals for their integrity, commitment and sincerity. He had good administrative skills and handled the responsibilities of the library of Kumaun University very well on his young shoulders. His relation was very cordial among the known, friends and colleagues. His passion for the profession made him known among other professionals at a very young age. He conducted various programmes to uplift the library professionals and encouraged young people to become multifaceted so that they can also do work for the upliftment of the library profession.

Unfortunate death came to him on 7th May 2021 in worldwide pandemic leaving the family, friends, relatives and LIS professional fraternity in utter shock.

'O lord! Don't be so harsh, we have lost our toleration'!

When I got the news of sudden demise of Dr. Suchetan Kumar, I was shocked and became speechless. His good memory with me was coming again and again in my mind and it was very hard for me to believe this news. However, your body has liberated from soul but your good deeds will be always with us and you have earned many good things in your life. As Dr. Ambedkar said "Life should be great rather than long" with your deeds and work you have made it true.

May god help the departed soul rest in eternal peace. My grief condolences to his family and also pray almighty to give the strength to his wife, three daughters and other bereaved family members to bear this tragic loss.

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The One Who Never Gave Up Finally Lost to Corona...!!!

Rahul Sah
Central Library, Government Medical College,
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Recalling Suchetan Sir We witness a personality that was cheerful always ready to help others and was rich in amazing talent.

It's about those days when Suchetan Sir formed SPLP (Society for Promotion of Library Professionals) for the upliftment of library professionals. Under which the workshop of KOHA Library Software was organized, in which I first met with Suchetan Sir,

He welcomed me with a broad smile, before the workshop got started, He said with great affection giving me the responsibility ***"Rahul you need to learn KOHA very well as you are the one who is further going to teach it to others...".*** His words have always been a source of inspiration for me.

In the last time of his life, I have seen him fighting with Corona. The doors of ICU, I often used to shake my hands through the glass and try to garner his attention. I wanted to tell that sir we are all here with you and praying for you, But the God had another plan. ***The one who never gave up finally lost to Corona...!!!***

Suchetan Sir today you are not with us but your memories and your lessons will always be with us.

Sir you had a lot of plans for advancement of Library science which we had to moveforward together.

You will always be a good friend, a great Mentor and an inspiration for me. There have been many experiences with you which will remain in my memories for all my life...

You will always be remembered sir...!!!

❐❐❐

Suchetan Kumar: As I Knew Him

Dr. Manoj Kumar Joshi
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Dr. Suchetan Kumar was working in Kumaun University, Nainital till his untimely demise due to COVID 19. He was a young and energetic library professional. In the absence of sufficient staff, he was successfully shouldering multiple responsibilities. These personal experiences describe his personality particularly relating to his role and views on conduct of LIS courses and doctoral research.

It is said that institutions are built by persons and not by infrastructure alone. Resources without persons have little potential to grow; but persons can build institutions even without sufficient resources. Once a person is determined to do something, the channels are not far off to catch, and easily become available to be used for the purpose. I have been a witness to events that took place in recent past, first very promising ones with great potential; and later the shattering of a beautiful dream of Dr. Suchetan Kumar. I first met him as incharge DSB College Library, when Dr. Pandey was at the helm of affairs in the University Library. He used to bear many responsibilities on his young shoulders, and all with a pleasant smile.

The shy young person, soon became a responsible crusader for establishment of full department of Library and Information Science; running of Bachelor and Master's degree programmes; undertaking exercise of curriculum revision for existing courses; continuing doctoral programme in the discipline; and lot more, besides two major responsibilities of managing college and university library, both. After Dr. Pandey, the Deputy Librarian of the University Library, left for his new assignment, this shy young man became a mature and responsible person in the University.

Although, I knew Dr. Suchetan prior to his taking over the reins of the university library and Department; but this acquaintance grew into a mature understanding and appreciation after his entering the mainstream of the university. During this period, we had frequent discussions on wide ranging topics. This provided me an opportunity to know him as a library professional, an administrator, an organizer and above all as a nice human being. In the following sections, I will endeavor to describe some of the facets

of his personality as I experienced during my meetings, telephonic talks and mail exchanges.

Efficient Coordinator of LIS Programmes

Kumaun University does not have a regular budgeted Department of Library and Information Science with full time regular faculty; the bachelor and master's degree courses are run by the existing library staff. The university library in-charge looks after these courses. Once Dr. Suchetan took over the responsibility of B.Lib.I.Sc. and M.Lib.I.Sc. programmes; he took keen interest not only in continuously running these courses, but improving and updating of the programmes so that these could be made more attractive for students and job market.

Organizing teaching programmes in any discipline, needs a combination of multiple skills to take care of every aspect right from idea generation through institutional approvals of different bodies; identifying and managing infrastructural resources; designing curriculum that meets the requirements of all stake holders; managing the capable and knowledgeable faculty besides administrative staff; ensuring fair admission process; ensuring satisfying learning experience to students; to their successful placement and finally joining the outgoing students through alumni thread.

I had a close interaction with Dr. Suchetan during curriculum revision process for B.Lib.I.Sc. and M.Lib.I.Sc. courses. We were three external members in the Board. He requested us to design the curriculum in such a way that the aspirations of students, capabilities of existing faculty, and demands of libraries and information centres, could be addressed simultaneously. Whenever, we suggested concepts with which their existing faculty was not having any prior experience, his immediate request was to identify a suitable person who could be contacted to cover that aspect. In this way, we introduced certain new concepts and prepared a panel of experts who could be invited for delivering extension lectures on certain areas of their expertise. This was particularly done in practical content. For covering some areas, I visited there to deliver lectures. Thus, the expertise of BOS members was fully utilized.

During that process, another aspect of his personality was revealed. He encouraged his young colleagues to attend the extension lectures delivered to the students so that they could empower themselves, and take care of students' needs in future. In this way, during our visits we used to have discussion on a wide area of syllabus beyond the immediate topic of purpose of visit. These discussions often took the shape of informal lectures.

A Sincere Researcher

Conducting research is a learning process that lasts the entire professional life. Every new project is a new learning experience, how so ever experienced

the researcher is, the person attains new insight every time. The assimilation of new experience with the known one, contributes in making a good researcher. His quality of accepting the experienced advice with inquisitiveness of a sincere researcher was remarkable. He used to have new questions till the researcher inside him was not satisfied. But during this entire process, his approach was not of questioning the other person's logic or argument, but was that of an innocent learner who wanted to know new dimensions of the problem. This approach made the discussion on the topic quite live and pleasant.

Open Hearted Research Supervisor

A university is known by the quality of research conducted by its faculty and research students. It should have a well-planned research programme in the disciplines, it has sufficient infrastructure and experienced faculty. The doctoral research programme was started in Kumaun University during the period Dr. S.K. Pandey was looking after the Departmental affairs. Later Dr. Suchetan also got opportunity to supervise doctoral candidates. Last year several candidates got registered with him. During the finalization of topic and synopsis preparation process of these candidates, we had interacted a number of times in person, over mobile or through emails.

This opportunity revealed new facets of his personality. It is a fact that nobody knows everything but at the same time it is also true that a researcher while doing his/her own research undergoes many new learning experiences that help the person in undertaking new projects and supervising others' projects. The supervision of doctoral candidates needs wide experience of different types of research projects, precautions to be taken before embarking on new projects, procedural accuracies in conducting research, adhering to established norms and guidelines, and above all, conforming to ethical expectations of quality research.

Research supervision is not an easy task. The candidate entirely depends on his supervisor for appropriateness of the research topic, diligent planning at different stages of research, conducting research in socio-economic, cultural and ethical manner, and finally reporting the research results in the widely circulated professional channels. Any oversight or ignorance of any aspect, may have devastating results.

Therefore, approaching right research supervisor is significant for successful conduct of a quality research. It can be rightly said that finding right supervisor is like completing half of the work. A research supervisor is not only a person who guides the researcher in his/her research work; but gradually becomes a mentor, a friend, and a senior member of the family. The researcher shares not only research related issues with his/her supervisor, but other professional, personal, official, future career related issues also. In an ideal situation, the supervisor is a guide for the candidate beyond the

completion of research project, and this relationship remains for entire life.

During my interaction with Dr. Suchetan regarding the topics of his candidates, I felt a very positive approach in his thinking. He used to be very concerned about the appropriateness of topics, feasibility of conducting research on those topics, potential problems that could be faced during conduct of the study, and professional relevance of the research topics. Of course, there are generally some apprehensions when one takes up responsibility as research supervisor for the first time; but discussing his candidates' potential topics with someone else, is a trait not seen in many persons these days. I still remember his concern for matching the doctoral candidates' capabilities and requirements of the potential topic of research. It is generally seen that the candidate shows keen interest on any topic, particularly till the registration process is over, as his/her prime motive during that period is to get registered for Doctor of Philosophy. Only few candidates have very focused approach towards their doctoral research topic. Therefore, it is the supervisor's responsibility to be vigilant on this issue. Dr. Suchetan, I observed was very particular on it, and ensured that instead of any easy topic the candidates finally selected the topics that were feasible and suited to their capabilities.

Another important trait I found in him, was having particular concern about quality and standard of doctoral research. While discussing the research topic, he particularly insisted on the topic to be such that the research is able to find out something new. Moreover, it could be completed in a reasonable time frame specified for doctoral research in the university. There were long discussions between us on the viability of research topics along these lines. The topics were finalized only after subjecting them to these criteria. I appreciated this approach and was convinced that he was growing in the right direction; and future of LIS research in Kumaun University was bright.

To Sum Up…

The COVID 19 pandemic, has been the most devastating event of the century. It has brought havoc to almost every walk of life. But it has been very painful to me, as in Dr. Suchetan I lost a trusted friend, younger brother and a professional colleague who had many dreams for advancement of librarianship in Uttarakhand. With his untimely demise, not only Kumaun University lost a young and energetic library professional, but a sincere and hardworking person with lots of dreams. The cruel destiny has snatched him from us, but hope his dreams will keep his memories alive and our efforts to make his wishes a reality, will be a true tribute to his fond memory.

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Suchetan Kumar: A Great Soul

Karnika Shah, Siddhi, Drishya & Drishtee

Suchetan, the name not unknown to any of you, is Bobby for us. Why is? He never left us, yes, he is physically not present with us. But the man, his thoughts, his vision, his dreams are alive with his family. He was the man who was ever ready to help and guide others. His curiosity and zeal were to push everyone to do their best. Bobby made me a strong and independent woman, the woman who could never say that anything is unknown to me. He taught me to address all ups and down of life and live life with dignity. He has always kept his eyes on his goals and had wonderful quality of ignoring which was not fruitful.

His vision and love for his family especially for his daughters was surprising. He had always kept his life planned and balanced. Though God has his own plans but his daughters and his wife will live up his dreams and carry own his legacy. We always feel his presence around us and guide us to move forward in life.

We would like to thank you all for taking this initiative and making him immortal part of your renowned organisation.

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A Humble Tribute to a Truly Extraordinary Man: Dr. Suchetan Shah

Prof. Lalit Tiwari
Kumaun University, Nainital

Gone from our sight, but never from our hearts.

Dr. Suchetan Shah worked as an Assistant Librarian at D.S.B. Campus, Kumaun University, Nainital. He was a man of great personality but his sudden departure from this world left us torn asunder. He was a dedicated teacher and a loving friend. He always had high regard for his students, friends, and family. This was very much reflected by the way he handled all thesituations of his life.

He completed his school education from 'Bhartiya Shahid Sainik School' and graduated from D.S.B. Campus, Nainital. After a while, he pursued B.Lib and M.Lib from Delhi University. In 2011, he was selected as an Assistant Librarian at D.S.B. Campus, Nainital. The library reached new heights under his able guidance, dynamic approach, and swift adaptability to technology. He also participated in Kumaun University Teacher's Association (KUTA) with great zeal and fervor. As the Vice President of KUTA, he incessantly raised his voice for the various issues of the teaching fraternity.

He also acted as the course coordinator of B.Lib and M.Lib run by IGNOU. As the Assistant Coordinator of IGNOU, he started classes for B.Lib and M.Lib on Sundays. He always believed that students are the future of the nation, so we should nurture them accordingly. The better we build them, the strong our nation will be. His actions always matched with his thoughts in this direction. Therefore, along with all the other administrative responsibilities he also acted as Assistant Dean Students Welfare of D.S.B. Campus, Nainital. His immense affection towards hisstudents in the form of able guidance always motivated them to do better in life.

Apart from being a wonderful teacher and an able administrator, another shade of his personality was his love for sports. Playing Hockey at flats was his favorite pastime. He loved playing football and cricket too. His admiration for sports influenced our students a lot. They understood the value of sports

in shaping one's personality. He always asked students to have a passion for certain things in life to succeed.

At home, he was a loving father and a great husband. 'When at home be completely at home' was his belief. He believed in spending valuable time with family members. He exhibited greatmanagerial skills by successfully handling his professional and personal life. He was a dynamic personality that I have ever known in my life. My last meeting with him at the campus happenedon the 8th of April 2021. I asked him about his well-being and family. It appears like yesterday to me. I am still unable to believe that he is no more among us. The short amount of time he spent with us was highly productive. 'What wonders he would have done was he given more time?' is the only thought that comes to my mind when I think of him. He was an inspiration for all of us. I will always cherish the time that I have spent with him in my heart. I believe his influence shallgo on through all the lives he has touched. I pay my humble tribute to such a wonderful person I have come across in my life.

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In The Memory of My Friend: Suchetan Kumar

Dr. C. C. Tiwari
Librarian, BTKIT, Dwarahat (Almora) Uttarakhand

Although both of us knew each other by phone and we used to talk sometimes. I met him for the first time in the year 2005 or 2006 that time he was working with Institute of Economic Growth, Delhi University, and on his call, I went there for a conference. That day I stayed at his house in Delhi and we talked a lot about the Library Profession, Nainital and about our career. His belonging made me feel like we have been friends for years. Shortly after that he will selected in Kumaun Univearsity Nainital, when I got to meet him regularly then I saw his dedication for work, for his staff and most of all for our Uttarakhand.

He was not only my friend but also a guide, mentor and very caring person. I used to think that such behavior of his only for me, but over time I realized that he is like this for everyone. Whenever I wanted to go to Nainital, I would definitely meet him. He often talks to find solutions to the problems of the students like helping students to get jobs, helping them in finance and counseling them. He could do anything for his students. He was like a bouquet with many virtues. He was excellent in his studies and was also a great hockey player, he was a very good teacher and he was also a skilled leader and the more social he was, the more caring he was for his family.It can be said about him that he was a shining star of Library Science in Uttarakhand. His inning had just started that suddenly God ended the game.

Friend Suchetan you have left this mortal world, but you will live on in every heart that knows you personally.

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1

Disaster Preparedness in Central University Libraries of Uttar Pradesh in Information Communication Technology Era: A Study

Dr. M. P. Singh & Prem Prakash Kushawaha

Abstract

The paper highlights on the disaster preparedness in the library. Drastically adopted of information communication technologies in library, it is essential to conservation of information resources for next generation. The study explores the conservation and preservation policy is existence in library and also examined the current disaster preparedness in the library. Further the study examines the types of problems faced by libraries while implementation of conservation and preservation policy in library.

Keywords: *Disaster preparedness, Academic libraries, Information communication technologies.*

Introduction

Information communication technologies are leading role played to conservation and preservation of information resources in the library. Due to information explosion and changing users' information needs it is needs of present hour to restructuring the library resources and services to enhancing the institutional raking and also better creation of environment to generation of knowledge, learning, teaching and research activities. The previous study indicates that drastically adopted of information communication technologies in libraries that almost libraries are made automated and its libraries are offering various ICT based various services to users. The main aim and purpose of library to conservation and preservation of information resources

to next generation. In this context, disaster preparedness is pivotal role played to conservation and preservation of information resources. Disaster is an unexpected event which lead to destroyed or losses of property, human beings of an organization.

Review of Literature

Dhiman and Joshi (2018) examined the disaster management plan in library: Really a threat. For this study authors were used a structure questionnaire consists of close and open-ended question to getting primary data. Authors found that majority of the libraries were have conservation and preservation policy in library. The study reveals that on the basis of historical data, the numbers of times disasters are occurrence in library but due to existence of disaster management plan help to control the minimum losses of information resources, staffs and users from disaster. Barua (2018) conducted a study the disaster management in libraries of Assam. For this study the author was used a survey method for gathering primary data concerned to research questions. The findings of the study, majority of the libraries have no disaster management plan in library, author also found in their study, most of the libraries are facing various types of problems likewise insufficient budget, inadequate skills LIS professionals in disaster management etc. Similarly, Moustaf (2015) opined that fewer library budgets, poor skills staff are major problems of implementation of disaster management plan in library. The author mention in their study, no any libraries have disaster management plan in written form. The author given suggestions to library and authority that disaster management plan should be existence in library. Further, Ishola (2017) conducted a study on the preservation and conservation of information resources and disaster management practices in library. the study reveals that most of the libraries were not have skills staff for conservation and preservation of information resources. The author found that fewer university libraries have conservation and preservation policy in libraries in document form.

Objectives of the Study

The following objectives have been formulated for the study. These are as follows:

1. To explore the conservation and preservation policy in libraries.
2. To find out the current state of disaster preparedness in libraries.
3. To investigate the major problems while implementation of disaster management policy in libraries.

Research Methodology

For the conduction study, survey research method was used to getting primary data of the research. Questionnaire was used a tool for gathering answered of the research questions. Total four questionnaires were distributed to the central university librarians of Uttar Pradesh and 100% questionnaires were received for analysis and interpretation of data. The MS- Excel 10 version application was used tools for presentation of data in table as well as graph form.

Scope and Limitation

The scope of the present study is very concise and precise. The study is limited 4 central university libraries of Uttar Pradesh. The respondents of the study are only covered to librarians of the central university library. The following universities are covered Aligarh Muslim University, Aligarh, Banaras Hindu University, Varanasi, Babasaheb Bhimrao Ambedkar University, Lucknow, University of Allahabad.

Data Analysis and Interpretation

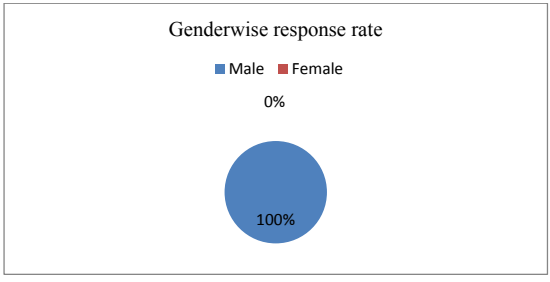

Figure 1: Gender wise response rate

Figure 1 shows the gender wise response rate of respondents under the scope of the study. The results reveal that 100% male librarians are holding the position of librarians in the academic libraries of Uttar Pradesh.

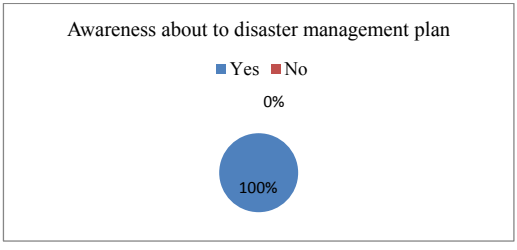

Figure 2: Awareness about to disaster management plan

Disaster management plan is one of the important roles played in library to assessment of risk of disaster and also its help the minimizes risk of disaster. The above figure 2 shows the awareness of librarians about to disaster management plan. The study reveals that 100% respondents are aware about to disaster management plan.

Table1: Adoption of conservation and preservation policy in library

Adoption of Policy	Response	Percentage
Yes	3	75
No	1	25

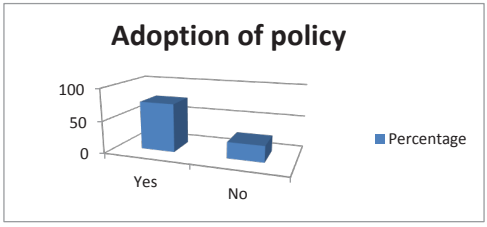

Figure 3

Table 1. and figure 3. shows the availability of conservation and preservation policy in library. It was found on the basis of data analysis; 75% university libraries were had conservation and preservation policy in library while 25% libraries were not adopted conservation and preservation policy in library.

Table 2: Reason behind not availability of disaster management plan

S.N.	Items	Response	Percentage
1	Lack of cooperation among library advisory committee	3	75
2	No need to disaster management plan in library	2	50
3	No significant holdings of rare books/ materials	1	25
4	Lack of human resources for implement	4	100
5	There is no perceived risk	2	50
6	Insufficient fund	1	25

Table 2 shows the reasons of not existence of disaster management plan in library. The above table indicates that numbers of reason were pivotal role played in the unavailability of disaster management plan in library. 75 % respondents were given their opinion about to lack of cooperation among library advisory committee, followed by 50% respondents were agree to about

the no needs of disaster management for library and there is no perceive in library, 25% respondents were given their reason about to no significance holdings of rare books / materials, 100% respondents were given reason about lack of human resources for implement.

Table 3. Current state of disaster preparedness in libraries

S.N.	Items	Response	Percentage
1	Well preparedness against disaster	3	75
2	Availability of disaster management tools	4	100
3	Skillful library staff to control disaster	2	50
4	Availability of sufficient fund to control disaster	1	25
5	Availability of highly data backup system	2	50
6	All resources kept in standard almirah	1	25

Table. 3 shows the current state of disaster preparedness in libraries. The study reveals that 75% university libraries were well preparedness against disaster. followed by 100% libraries were have disaster management tools, 50% libraries were had skillful library staff to control disaster and have highly data backup system, 25% libraries were having all resources kept in standard almirah in library.

Table 3: problems faced while implementation of disaster management plan in library

S.N.	Items	Response	Percentage
1	Lack of interest on the part of staff	3	75
2	Insufficient existence of disaster management tools	4	100
3	Technophia	2	50
4	Lack of suitable accommodation for libraries and archives	4	100
5	Financial incapability of the library	3	75
6	Care free attitude of library personnel/ authority	2	50

Table.3 shows the faced problems while implementation of disaster management plan in libraries. The study reveals that most of the university libraries were facing lack of interest on the part of staff and financial incapability of the library. Followed by 100% libraries were not implementation of disaster management plan in library due to insufficient existence of disaster management tools and less suitable accommodation for libraries and archives, 50% libraries were not implementation because of technophia and care fee attitude of library personnel/ authority.

Conclusion

Disaster management plan is drastically role played in the library for preparedness against disaster. On the basis of data interpretation, the results reveal that majo rity of the libraries are have no disaster management plan in written form. The present conduction study reveals that fewer university libraries were having conservation and preservation policy in library. Further found that most of the libraries are prepared to control the disaster in library. The study results reveal that majority of the libraries were facing several problems while tried to implementation of disaster management plan in library likewise financial incapability, technophia, less suitability of accommodation, less interest taken by staff etc. There are needs of present hour to implementation of disaster management plan in library due to uncertainty occurrences of disaster in library. Disaster management plan is not only prevention of disaster occurrence in library but also provides the safety of users, staff as well as library holdings. The university authority and other similar national important organization such as University Grant Commission, NAAC etc should be mandatory to implementation of disaster management plan in library.

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About Authors…

Dr. M. P. Singh is working as a Professor in the Department of Library and Information Science and also, holding position of PIC Establishment section at Babasaheb Bhimrao Ambedkar Central University, Lucknow, UP (India). He has more than 20 years of administrative and teaching experience in the LIS profession. Prof. Singh has been written 04 books, 14 edited books, and published more than 80 research papers and chaired many sessions in Conferences at various level. He has organized more than 10 conference and more than 6 webinars. Prof. Singh has been visited more than seven countries and awarded & honoured by Professor Veena Saraf Award-2018, Best Teacher Award and Best Library & Information Science Teacher's (LIST) Award-2018 at the International & National platform.

Mr. Prem Prakash Kushawaha is presently pursuing Ph.D. in Library and information science at Department of Library and Information Science, Babasaheb Bhimrao Ambedkar University (A Central University) Lucknow. He has published 26 papers in National/International conference, Reputed journals as well as edited chapters.

2

Core Competencies of Library Staff: A Study of Selected Institutes of Uttarakhand

Deepak Pawar

Introduction

Libraries have to continuously adopt new changes in the ever-changing environment. Advancements in new technologies challenge the library professional to develop new skills to serve the user community. We have seen from the recent past how libraries adapted the new normal in a very short time. So, libraries need to rethink about its services regularly and must adopt new challenges as an opportunity. Library leaders must think to develop skills of library staff continuously so that they can serve the user community at their best.

The present paper focuses on the core competencies of library staff required to serve the users of the library. Core competencies are the skills and knowledge necessary for doing a job. This paper tried to know the need of orientation and training programmes for library staff.

Review of Literature

Smith and et. al. (2013) examined how University of South Florida library reevaluated its workforce to make best use of the human resource. Further identified the need for personalized core competencies. Talbot and et. al. (2007) explored the competencies for curriculum development, quality assurance and assessment selection applied in an Australian university. The authors argued that competencies are a useful tool to assist the process of curriculum development, ongoing quality assurance and selection of assessment items for health promotion education. Chan (2006) explored the performance management process and core competencies framework of Canadian public

libraries. Performance appraisal process has been used to evaluate the core competencies of the employees.

Objectives of the Study

The objectives of the study are as follows:

1. To identify the core competencies of the library staff.
2. To find out the challenges encountered in serving users by library staff.
3. To know the need and opportunities of training and orientation programmes for library staff.

Research Methodology

Survey method was used to achieve the objectives of the study. Questionnaire was used as a tool for data collection. After the data collection, data was tabulated, analyzed and represented graphically using MS Excel.

Scope and Limitation

The scope of the present study is limited to only 4 institute libraries of Haldwani, Uttarakhand. This study covers working library professionals of selected institute libraries of Haldwani, Uttarakhand. The following institutes are covered for the study: Government Medical College (GMC), Haldwani, Amrapali Institute Technology & Science, Halwani, Pal College of Technology & Management, Halwani and Inspiration College of Teacher Education, Haldwani.

Data Analysis and Interpretation

No. of Specialization Area

Table 1 No. of Specialization Area

Area of Specialization	Amrapali (A.I.A.S)	%	GMC	%	PAL College	%	Inspiration	%
Acquisition section	4	57.14%	3	60%	0	0%	0	0%
Technical section	6	85.71%	3	60%	1	33.33%	0	0%
Circulation section	5	71.42%	4	80%	2	66.67%	0	0%
Reference section	3	42.85%	3	60%	0	0%	1	100%
Periodical section	6	85.71%	2	40%	0	0%	0	0%
Any other	0	7.69%	0	00%	0		0	0%

The above table shows that the highest specialization of staff is in Amrapali i.e., 85.71% in technical and periodical section. In GMC it is 80.00% in circulation section. In Pal College staff specialized highest in circulation section. In Inspiration College the specialization area of staff is 100% in Reference Section.

Academic Qualification

Table 2: Academic Qualification

Academic Qualification	AMRAPALI	GMC	PAL COLLEGE	INSPIRATION
Under graduate	1	0	0	1
Post-graduation	5	5	3	0
M. Phil	2	0	0	0
Ph. D	0	0	0	0
Any other	0	0	0	0

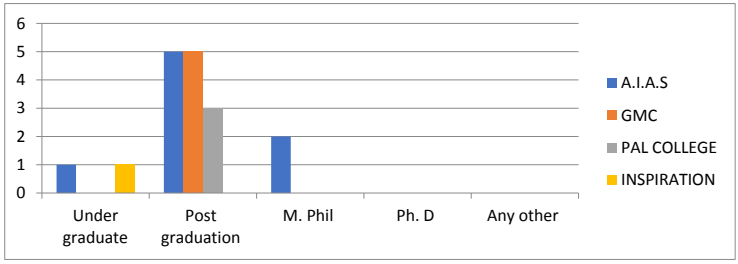

Figure 2: Academic Qualifications

This table shows the academic qualification of library staff of the universities

1. AIAS is having UG 1, PG 5, M Phil 2, PhD 0, other staff 0.
2. In GMC, there is only 5 Post graduate.
3. In Pal College UG has 0, PG 3. M Phil 0, PhD 0, other staff 0.
4. Inspiration College has staff of UG 1, PG 0, M. Phil 0 PhD 0, 0ther 0.

Professional Qualification

Table 3 Professional Qualification

Professional Qualification	AMRAPALI A.I.A.S	GMC	PAL COLLEGE	INSPIRATION
Certificate	0	0	0	0
Diploma	0	0	0	0
Degree	7	5	3	1
Other	1	0	0	0

Table 3 describes about the professional qualification of library staff. Total degree holders are 7 in Amrapali (AIAS), 5 in GMC, 3 in Pal College, 01 in Inspiration.

Staff Experience

Table 4: Staff Experience

Experience	A.I.A.S	GMC	PAL COLLEGE	INSPIRATION
Less than -5 years	0	0	1	1
6-10 year	4	0	2	0
11-15 years	3	5	0	0
More than 15 years	0	0	0	0

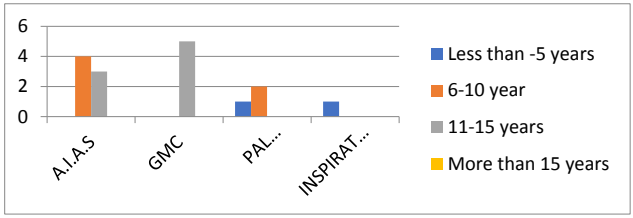

Figure 4: Staff Experience

Table and figure 4 show the experience of the staff members of the library. The library staff's having the experience less than 5 years are 1 in Pal College and 1 in Inspiration, staff having the experience 6-10 years 4 in AIAS, 2 in Pal College. Staff's having the experience of 11- 15 years are 3 in AIAS and 5 in GMC.

Technical Qualification

Table 5: Technical Qualification of Library Staff

Technical Qualification	A.I.A.S	GMC	PAL COLLEGE	INSPIRATION
Yes	6	4	1	1
No	1	1	2	0

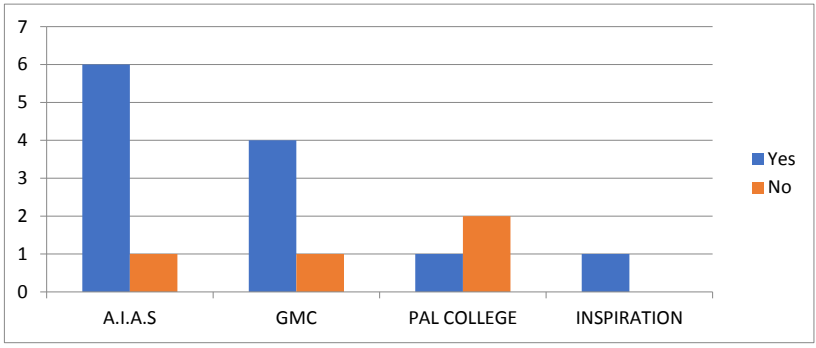

Figure 5: Technical Qualification of Library Staff

Table 5 and figure 5 provides the information about the technical qualification of the library staff. The number of staff having the technical qualification are 6 in AIAS, 4 in GMC, 1 in PAL College, 1 in Inspiration.

Need Any Specialized Training

Table 6: Specialized Training

Need of Specialized Training	A.I.A.S	GMC	PAL COLLEGE	INSPIRATION
Yes	6	4	2	1
No	1	1	1	0

Table 6 shows about the specialized training for library staff. No. of staff requiring the specialized training are 6 in AIAS, 4 in GMC, 2 in PAL, 1 in Inspiration. Hence AIAS staffs are highest in no. in case of need of specialized training.

Awareness about the Core Competencies

Table 7: Awareness About Core Competencies of Library

Awareness	A.I.A.S	GMC	PAL COLLEGE	INSPIRATION
Yes	5	4	3	1
No	2	1	0	0

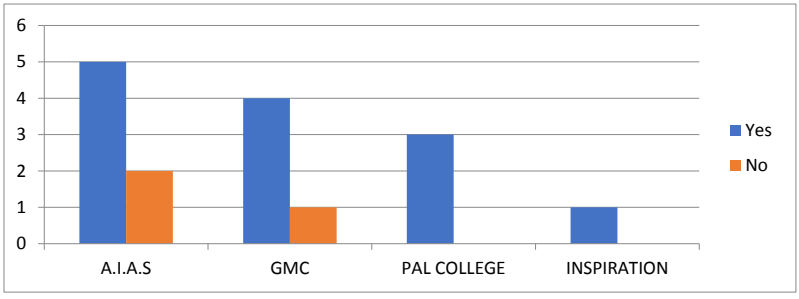

Figure 7: Awareness About Core Competencies of Library

Table and figure 7 shows that AIAS have highest no. of staff 5 who are aware about the core competencies. It is followed by GMC where the no of staff is 4, PAL College 3, Inspiration is 1 who is aware of the core competencies of the library.

Opinion of Library Staff about the Core Competencies of the Library

Table 8: Core Competencies of Library

Core competencies of your library	A.I.A.S	GMC	PAL COLLEGE	INSPIRATION
Library collection	4	4	2	0
Library budget	4	1	0	0

Core competencies of your library	A.I.A.S	GMC	PAL COLLEGE	INSPIRATION
Library staff	3	1	1	1
Library sources	5	1	0	0
Library users	4	2	0	0

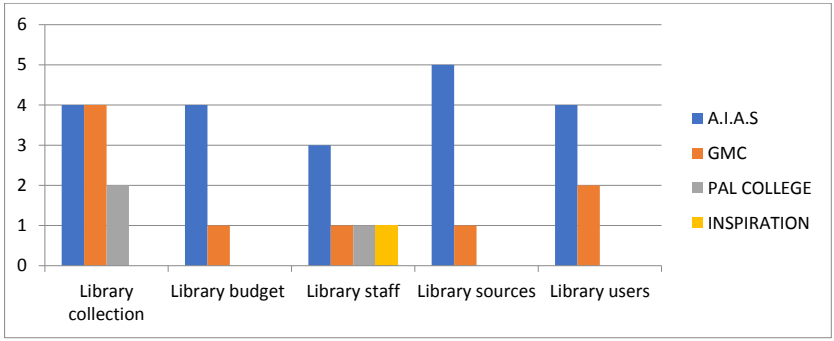

Figure 8: Core Competencies of Library

Table 8 describes about the core competencies of library. have highest opinion regarding the core competencies which is 18 for library collection, 12for library budget, 11 of library staff, 3 of sources, 6 for the users. BMIDU has the least regarding the core competencies which is 1 of sources.

Findings

The major findings of the study are as follows:

1. Although all the libraries except Pal and Inspiration have availability of staff specialized in every section but the proper allotment of staff to every section is necessary for overall improvement of the library.
2. Most of the staff in every library is post graduated but staff of the Inspiration is undergraduate.
3. As far as the experience of the staff is concerned, less than 50 % of the staff is experience in each college.
4. All the libraries have technically sound staff.
5. Only 50% of the staff is aware about the core competencies.
6. Core competency of the library staff is average in all the fields.
7. On an average, more than 50% think that the library staff is competent to serve the users and the libraries have sufficient library staff.
8. Almost everyone believed in team work.
9. Results of the collaboration of the users is average.

Conclusion

Core competencies are very much needed for library staff to cope up with the latest technological advancements. All library leaders and administrators must organize training programs to develop core competencies and skills of library professionals to better serve their users. The study revealed that the core competencies of the library staff is average in all the fields.

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About Author

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3

Information Communication Technology and Their Need & Access by Tourists in Nainital

Dr. Charu Chandar Tiwari

Abstract

Everybody needs information for some purpose. When we want to travel, we need information about routes, timings of the transport services, hotel facilities, and the like; we may gather this information from a friend or from a travel agency. We may also go to a library and collect this information from some documents like tourist guides, railway time tables.

***Keyword**: Information, ICT, Tourist, Internet, Nainital, Uttarakhand.*

Introduction

In this era, Information is very important for us without the information we can't survive in the Information Communication Technology (ICT) environment. This paper is based on information need and how do access information by tourists. Information is organized fact, data in written form. Information is very essential for everyone, whether people are illiterate or educated. It is quite evident by now that information is vital to every individual and there is no aspect of a person's life where information is not required. Ask a person, what is 'Information' means and the reply will come, "Information is facts (or data, or knowledge, even wisdom)". There is a very thin line drawn between the meanings of all the terms mentioned the mean of information. While it is not altogether wrong to call information, data or facts or even knowledge – yet it may be that either some of these terms (data, facts) are only a part of information or that information is a part of them (knowledge, wisdom). Information is universal – it is known to all men is all languages,

there may or may not be a precise or appropriate word in a language to describe the term 'Information', but surely it is there.

The concept of 'information need' one has to first define the term 'need'. But the use of terms like 'want', 'requirement', 'demand' etc. to explain the term 'need' further complicates matters.

The Encyclopedia of Psychology has given a comprehensive and clear explanation of the term 'Need'-"Need is one of the several English words (the other being drive, motive, want, urge, desire and so on) –each in some respects unsuitable-used by psychologists today to designate an internally or externally aroused, brain-located force (often coupled with an accelerating emotion), subjectively experienced as an impulsion or felt necessity (a mild or intense urge) to act (immediately or later) so as to produce a certain specifiable terminal effect which is ordinarily expected to be beneficial to the actor, and /or positively hedonic (less painful, more pleasurable) hedonic (less painful, more pleasurable) relative to the arousing situation."

There is such a thing as 'Information Need' goes without saying. The problem (as is the case with the term 'Information') again lies in the difficulty of finding a proper definition. Crawford agrees that 'Information Need' is a difficult concept to define, to isolate and especially to measure. It involves a cognitive process, which may operate on different levels of consciousness, and hence may not be clear even to the inquirer himself.

In this below Fig.1.1Show that information is required when the problem is generated and then it will be processed and solves the problem. This is a circle of information needs. The problems will not disappear and Information has to change along with time but never end.

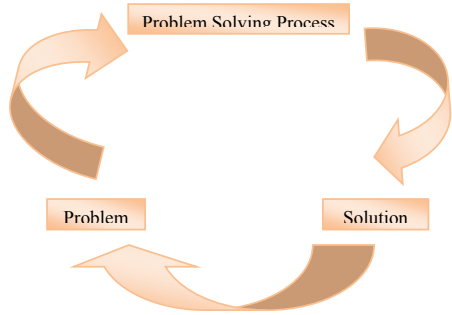


Figure 1: Model of Information needs

Information Access

Information access is an area of research at the connection of Informatics, Information Science, Information Security, Language Technology, Computer

Science, and Library Science. The objective of the various research efforts in information access is to simplify and make it more effective for human users to access and further process large and unwieldy amounts of data and information.

Objectives of the Study

1. To find out various types of Information Sources used by tourists in Nainital.
2. To know the information seeking behavior of tourists.
3. To know the role of the internet for providing the latest information for tourists.
4. To find out various types of information needs of tourists in Nainital.
5. To find out problems faced by tourists during gain of information in Nainital.

Scope of the Study

Information is essential for everyone, whether its foreigner or Indian. Anyone who visits Nainital they need information about that place. Information is accessed through print or electronic form. Every visitor has their own need and they fulfill their needs in their own way. Some of the visitors take information from person to person. Some of the tourists go through electronic mode and some of preferring print forms.

Research Methodology

The questionnaire is taken as a research tool in this study. The efforts are taken to make the instruments used valid and reliable. The concept of legitimacy deals with the truthfulness of findings while reliability deals with the consistency. Altogether 150 a questionnaire was distributed and 140 questionnaires were duly filled with tourists and find valid for further observation.

Hypothesis of the Study

1. Most of the tourists get information from the internet about Nainital.
2. Mostly tourists get information through the Nainital tourist website.
3. Most of the tourists face various problems during to visit the Nainital.

Review of Literature

A literature review is a survey of everything that has been written about a particular topic, theory, or research question. It may provide the background

for larger work, or it may stand on its own. Much more than a simple list of sources, an effective literature review analyzes and synthesizes information about key themes or issues.

Gunasekera (2015) "A Study of Information Seeking Behavior of Academic Sociologists through Citation Analysis at the University of Peradeniya, Sri Lanka" reveals that 'seeking information, types of information sought, methods used for seeking information and the use of information technology to access information by the academic sociologists' The study led to the general conclusion that the academic sociologists' information needs are of diverse in nature and they use wide variety of information sources to satisfy their information needs. Most of the sociologists depend on books and journals and preferably of print media in comparison to the electronic media.

Sahu, Goswami and Choudhary (2014) "Information Needs of Library Users of Selective Metallurgical Institutions in Jharkhand" revealed that 'the R&D groups of these organizations used a variety of formal and informal information sources effectively in meeting their research information needs'.

Choudhary and Sarmah (2014) "Information Seeking Behavior of Scientists of ICAR, Meghalaya: A Study" say that to examine different facets of information seeking behaviour, and specifically the information needs and seeking behaviour of agricultural scientists of ICAR Institutes of Meghalaya, use pattern and also different types of constrains faced by them."

Sarma and Sarma (2014) "Information Seeking Behaviour of Students in Digital Era: A Study on the Postgraduate Students of Life Science of Rajiv Gandhi University, Arunachal Pradesh" Say that 'study made an effort to determine the sources used for accessing e-resources in particular. Libraries are regarded as beating heart of a university setup. It can play important role in student's information-seeking behavior, which is considered as a multifarious, dynamic, social human behavior that needs a picture as rich as possible to truly understand the phenomenon."

Devi and Dlamini (2014) "Information Needs and Seeking Behavior of Agricultural Students at the University of Swaziland: A Case Study" say that 'study sought to understand literature searching experiences and skills of the students of the faculty of Agriculture of the University of Swaziland (UNISWA), Swaziland, of Southern Africa. The purpose of the study was to determine their information requirements and also to determine their awareness of library services available to them'.

Shafique and Mahmood (2013) "Variable Affecting the Information Needs and Seeking Behavior of Educational Administrators: A Review" reveals that 'many variables are affecting the information needs and seeking behavior of educational administrators: such as their work context, administrative responsibilities and work experience along with source preferences and use of information. It was also found that no comprehensive research study

was conducted to find out the information needs and seeking behavior of educational stakeholders working at the administrative positions in Pakistan (i.e., deans, registrars, heads of departments in universities, school and college principals etc.).'

Padma, Ramasamy and Sakthi (2013) "Information Needs and Information Seeking Behaviour of Post Graduate Students of School of Economics at Madurai Kamaraj University: A User Survey" Say that 'the understanding of information needs and information-seeking behavior of various professional groups is essential as it helps in the planning, implementation and operation of information system and services in the given work settings.

Data Analysis and Interpretation

The data collected by the questionnaire was tabulated and graphed. The analysis and interpretation of the data collected is being described in below.

Table 1: Details of the Questionnaires

Tourists	Respondents	Percentage
Male	75	53.6
Female	65	46.4
Total	140	100

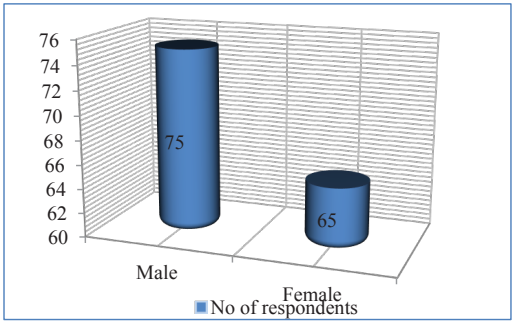


Figure 2

The above table and its figure no.2 shows that questionnaires were distributed among 150 respondents and 140 questionnaires were received duly filled by the respondents. The table further highlights that 75 (53.6%) were male respondents, whereas were 65 (46.4%) female respondents.

Table 2: Age wise distribution of the Respondents

Age	Respondents	Percentage
Less than 20	6	4.3
20-30	86	61.3

Age	Respondents	Percentage
30-40	41	29.3
40-50	5	3.6
More than 50	2	1.4
Total	140	100

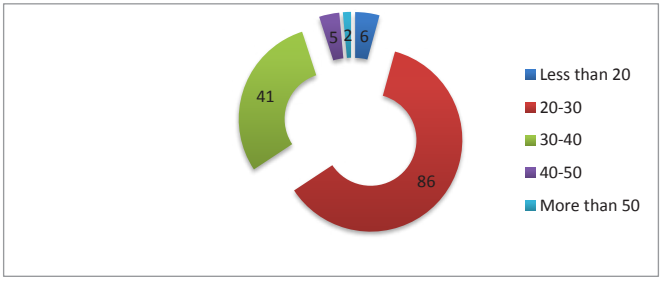


Figure 3: Age wise distribution of the Respondents

The above table 2 and its figure no. 3 show that highest respondents 61.3%. are Age group between 20–30 years, 4.3% respondents are age group of less than 20,29.3% respondent are age group between 30-40 years,3.6% respondents are age groups between 40-50years, 1.4% respondents are age groups of more than 50 year.

Table 3: Awareness of the Internet

No of Respondents	Awareness of The Internet	
	Yes	No
150	135	5

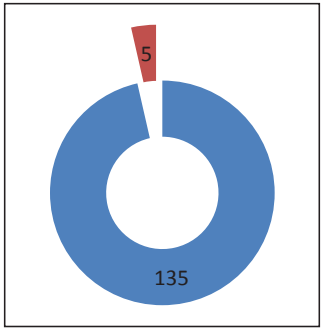


Figure 4: Awareness of the Internet

The above table no. 3 and its figure no. 4 show that 96% of tourists are aware about the internet while 4% are unaware.

Table 4: Usability of Internet

Usability of Internet	Respondent	Percentage
Always	12	8.5
Usually	76	54.3
Sometime	45	32.1
Never	7	5
Total	140	100

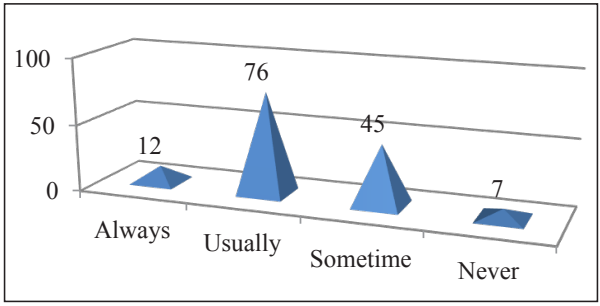


Figure 5: Usability of Internet

The above table no.4 and its figure no.5 show that 54.3% of tourist usually use internet while 32.1% tourist use internet sometime. 8.5 % of tourist use always internet and 5% tourist never use internet.

Table 5: usage pattern of Information by respondents

Medium of Information	Respondent	Percentage
Prints	20	14.3
Electronic	50	35.7
Both	70	50
Total	140	100

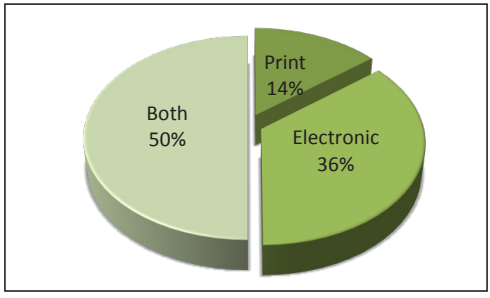


Figure 6: Usage pattern of Information by Respondents

The above table no. 5 and its figure no. 6 show that 50% of respondents use both medium of information and 36% of respondents use electronic medium while 14% respondents use prints medium.

Table 6: Purpose for Visit

Purpose of Visit	Respondent	Percentage
Interest to visit tourist place	99	57.6
For personal visits	28	16.3
Entertainment	21	12.2
Research purpose	11	6.4
Any other	13	7.5
Total	172	100

(Multichoice option)

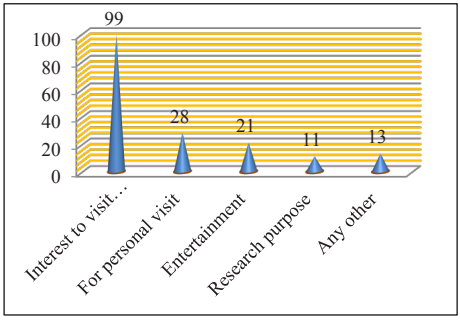


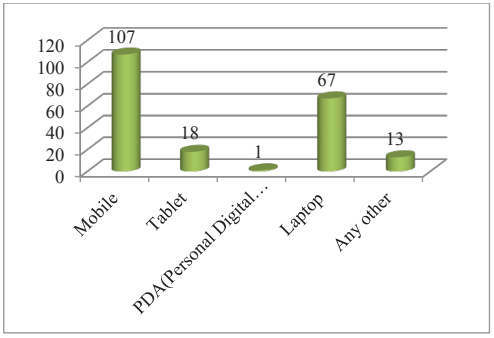
Figure 7: Purpose of Visit

The above table no. 6 and its figure no. 7 show that 57.6% respondents have interest to visit Nainital. 16.3% respondents have their own personal interest to visit Nainital. 12.2% respondents visit Nainital for only entertainment purpose. 6.4% respondents visit Nainital for research purpose. 7.5% respondents have their own other region for visit Nainital.

Table 7: Medium for accessing Internet

Access of Internet	Respondent	Percentage
Mobile	107	51.9
Tablet	18	8.7
PDA (personal digital assistant)	1	0.5
Laptop	67	32.5
Any other	13	6.4
Total	158	100

(Multichoice option)



Figures 8: Medium for accessing Internet

The above table no. 7 and its figure no. 8 show that 51.9% respondents use mobile for internet, 32.5% respondent use laptop for internet, 8.7% respondent use tablet for internet, 6.4% respondents use another option (like cybercafe, Desktop) for internet, 0.5% respondents use PDA (personal digital assistant).

Table 8: Information Sources

Information Sources	Respondent	Percentage
Tour guide book	66	19.2
Guide person	11	3.2
Google map	76	22.1
Google search	91	26.5
Map of place	39	11.3
Tourist website	34	9.9
Commercial website	11	3.2
Any Other	16	4.6
Total	344	100

(Multichoice option)

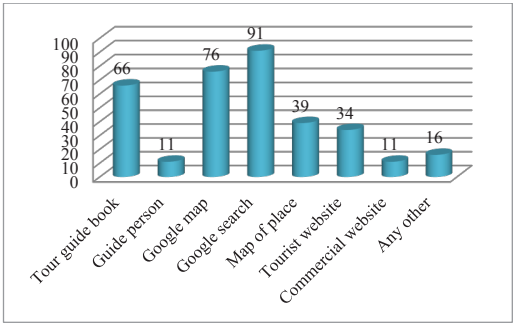


Figure 9: Information Sources

The above table no. 8 and its figure no. 9 show that the 26.5% respondents use Google search, 22.1% respondents use Google maps, 19.2% respondents prefers a tour guide book, 11.3% respondents use map of the place, 9.9% respondents use to visit tourist office website, 4.6% respondents use any other option, 3.2% respondents use tour guide book and commercial website respectively.

Table 9: Access Information from UKTD

Access Information From UPTD	Respondent	Percentage
Help desk	3	2.1
Regional tourist office, Nainital	9	6.5
By UK Tourism office website	22	15.7
By contact no given on uttarakhand tourism office	0	0
Not use	106	75.7
Total	140	100

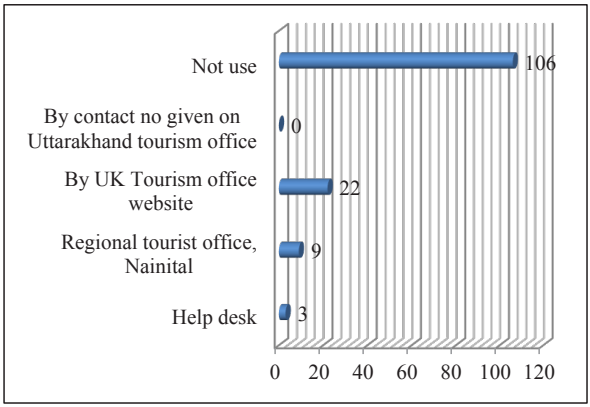


Figure 10: Access Information from UPTD

The above table no. 9 and its figure no.10 show that 75.7% respondents never concern the tourist website, 15.7% respondents concert the UKTD website, 6.5%respondents concern the regional tourist office, 2.1% respondents use the helpdesk and no one use the contact no which mention in the website

Table 10: Tourist Reach Nainital

Tourist Reach Nainital	Respondent	Percentage
Tour trip	12	7.6
Relatives and friends	39	24.7
Self basis	99	62.7

Tourist Reach Nainital	Respondent	Percentage
Any Other	8	5.0
Total	158	100

(Multichoice option)

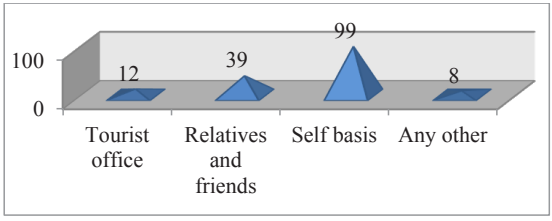


Figure 11: Tourists Reach Nainital

The above table no. 10 and its figure no. 11 show that 62.7% respondents reached Nainital by self-basis, 24.7% respondents reached Nainital by consulting relative and friends, 7.6% respondents reached Nainital by tour trip and 5% respondents reached Nainital by any other mode.

Table 11: Satisfaction of Information Source provided by UK. Govt.

Satisfaction of Information Source provided by UP. Gov.	Respondent	Percentage
Excellent	9	6.4
Very good	3	2.1
Good	32	22.9
Fair	25	17.9
Poor	1	0.7
Not applicable	70	50
Total	140	100

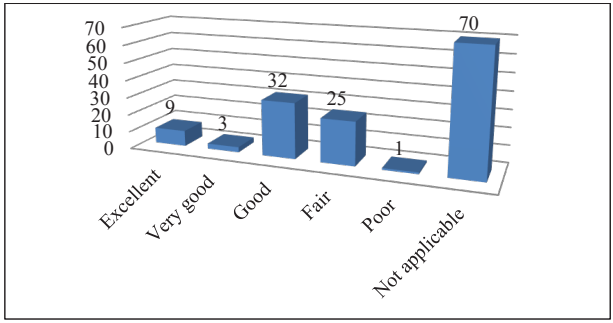


Figure 12: Satisfaction of Information Source provided by UK. Govt.

The above table no. 11 and its figure no.12 show that 50% respondents have not used the U.K. Govt. Website, 22.9% respondents give good response for their service, 17.9% respondents give fair response, 6.4% respondents give excellent response, 2.1% respondents give very good responses, and 0.7% respondents are given poor response.

Table 12: Satisfaction of Emergency Service Provided by UK Tourism Office

Satisfaction of Emergency Service Provided by UK Tourism Office	Respondent	Percentage
Highly satisfied	4	2.9
Satisfied	27	19.3
Average satisfied	13	9.3
Not satisfied	6	4.2
Not used	7	5
Not applicable	83	59.3
Total	140	100

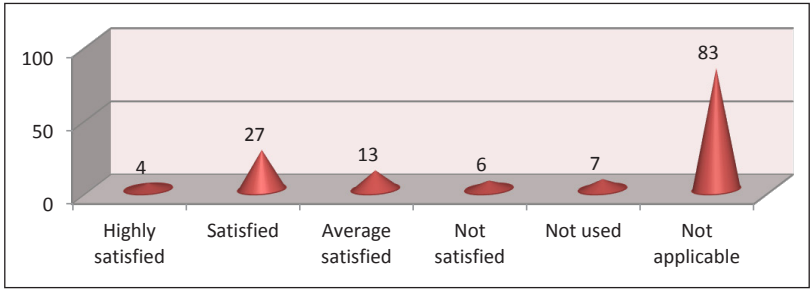


Figure 13: Satisfaction of Emergency Service Provided by UK Tourism Office

The above table and its figure no. 13 show that 59.3% respondents have no idea about this service, 19.3% respondents satisfied the service, 9.3% respondents average satisfied, 5% respondents not used the service but they know the about service, 2.9% respondents highly satisfied.

Table 13: Depend on Professional Help

Depend on Professional Help	Respondent	Percentage
A lot	5	3.6
Very little	56	40
Average	16	11.4
Sometime	25	17.9
Not applicable	38	27.1
Total	140	100

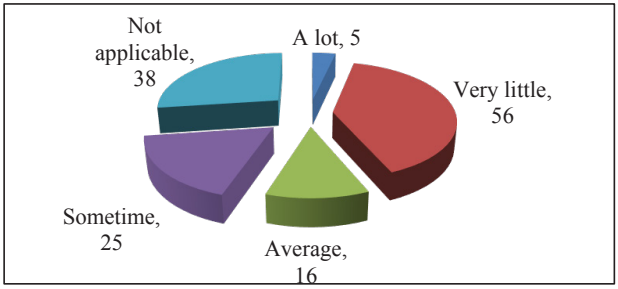


Figure 14: Depend on Professional Help

The above table and its figure no. 14 show that 40% respondents take very little help for professional, 27.1% respondents have not necessary for the professional help, 17.9% respondents take some time help, 11.4% respondents take average help, 3.6% respondents take a lot of help.

Table 14: Problem face by Tourists

Problem Face by Tourist	Respondent	Percentage
Insufficient information on site	14	9.5
Insufficient information in guide book	5	3.4
Language barrier	41	27.9
Guide	10	6.8
Money exchange	7	4.8
Any Other	14	9.5
No problem	56	38.1
Total	147	100

(Multichoice option)

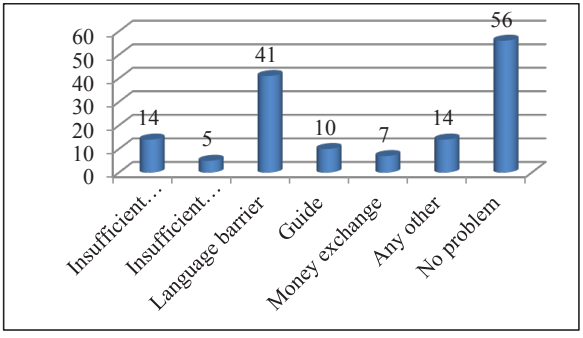


Figure 15: Problem face by Tourists

The above table and its figure no. 15 show that 38% respondents have no problem during the visit they easily communicate with the local people, easy visit historical place, temple, 27.9% respondents have face language problem, 9.5% respondents face insufficient information on the website and local problem (noise, chatted with other people, fooding problem) respectively, 4.8% respondents face money exchange problem., 3.4% respondents face insufficient information in guide book.

Testing of Hypothesis

The present research is a study of "Information Communication Technology and their Need & Access by Tourists in Nainital". The researcher on the basis of the analysis of data has arrived at some conclusion.

The hypotheses in the present study are being tested whether they stand accepted/ proved or rejected/ disapproved. The following are the hypothesis of the study:

1. The first hypothesis is "Most of the tourists get information from the internet about Nainital" on the basis of finding we prove the first hypothesis that 52% tourist use internet for accessing information which they need. That means our hypothesis which we taken are correct.
2. Second hypothesis is "Mostly tourists get information through the Nainital tourist website" finding reveals that 50% tourists don't know about the Nainital website. That means our hypothesis which we take-in is proven wrong.
3. Third hypothesis is "Most of the tourists face various problems during a visit at Nainital" This is proved wrong because 38% tourists was not facing any problem during the visit. It shows that Nainital environment is very friendly and their persons are very helpful and supportive.

Findings

Following are findings and conclusion of the research. On the basis of data given by respondents these are follows:

1. It is found that 96% of tourists are aware about the internet and 54% tourists are use internets.
2. The result shows that 50 % of tourists prefer both (print and electronic) mediums to access to the information.
3. The study shows that 52% tourists are use mobile for accessing the internet and 26% tourists are use Google search for accessing information.

4. Finding reveals those 76% tourists don't know about Uttarakhand Tourist Department in Nainital and 63% of tourists visit independently.
5. It is found that 50% tourists don't know about information source which provided by the tourist department and 59% tourists are not aware about emergency services.
6. It is found that 27% of tourists are not aware about the tourist professional help which provided by tourism department and 38% tourists don't face any problem during the visit.

Conclusion

In the present study conclude that the information is essential for tourists also but the tourism department is not aware about the tourist needs so tourist will prefer Google and other search engine for retrieved their information. The progress of modern society as well as individuals depends a great deal upon the provision of the right kind of information, in the right from and at the right time. Information is needed to be able to take a right decision and also reduce uncertainty.

The study reveals that the tourism department must improve their official website and includes street layout, relevant place information and provide maps so that it can helpful for tourists. It also can improve the relevancy of a tourism office website and emphasis status.

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About the Author…

4

An Inclination of The Library Towards Sustainable Development

Shraddha Dixit & Prof. M. P. Singh

Abstract

In view of the time that is going on today, it has become necessary to adopt green because the effect that the environment is having on our life is not only harmful for today but it is also harmful for our coming generation, this is a new initiative of sustainable development which is being adopted by the library. Green libraries play an important role in awareness towards green initiatives in users, staff, and other community members that come to the library. This paper presents the green library, sustainable development, and the role of librarian in the green library in the present scenario.

Keywords: *green library, sustainable development, role of green library.*

Introduction

The Green Library was started in the decade of 1990, which was first seen in foreign countries, but since the entry of Indian Green Building in India from 2001, Green Library has gained momentum here and now not only the library is new but present here. All the offices, community centers have also turned their attitude towards green and are adopting from it, so that now our India will also come towards green sustainable by 2030. We should contribute to the sustainable development so that we can save our future as well as our health. She is trying to achieve a sustainable development by using Green Library parameters in Sustainable Development which is a good start Some Green Library are using Standards like LEED, BREEAM, IGBC etc.

Sustainable Development Goals

All United States Member States endorsed the 2030 Agenda for Sustainable Development in 2015, which provides a shared roadmap for peace and prosperity for people and the planet today and in the future, but today this goals not only being adopted by UN members but by the entire world. These 17 goals are given below:

SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

https://www.un.org/development/desa/dspd/2030agenda-sdgs.html

Meaning of Sustainability

The term sustainability was used as an international issue by the book 'The World Conservation Strategy' in 1980, since then the term has come into use widespread and has contributed to the use the development of the nation by taking into account its economic, social, and ecological aspects.

According to the International Union for Conservation of Nature (IUCN) 'Sustainability is the ability to improve the quality of human life while living among the carrying capacity of Earth's auxiliary ecosystems'.

Some other major initiatives have been taken by the ministry of environment, forest and climate changes these are given below-

1. **CAMPA:** it is Compensatory A forestation Fund Management and Planning Authority. Its aim is to provide leftover natural forest must be conserved, protected, regenerated, managed, and Supports additional services such as biodiversity, carbon cycling, and primary production that are required for the production of natural ecosystems.
2. **National River Conservation Directorate (NRCD):** The National River Conservation Directorate (NRCD) comes under the Department of

Environment, Forests, and Climate Change it is in charge of enforcing the Centrally Sponsored Schemes of the National River Conservation Plan (NRCP) and also the National Plan for the Conservation of Aquatic Ecosystems (NPCA) for the river, lake, and wetlands conservation in the country.

3. **Capacity Building for Industrial Pollution Management:** The main objective of this project is to control the organizational and scientific framework for the restoration of heavily polluted sites as a result of fast industrialization, which is being tested in two states and to develop actual technical and human ability in state bodies to carry out projects aimed at lowering the pollutions to the population, livelihood, and ecosystem that have been linked to previous damage to the environment.
4. **National Green Tribunal:** NGT 2010 was established, its main objective is related to environmental protection and conservation of forests and other natural resources, in which legal rights and all matters related to the environment are attached.
5. **National Mission on Himalayan Studies (NMHS):** Under the mission on Himalayan studies, regulates the climate for most of Asia and is revered for its holy, religious, and intellectual values around the world.
6. **Leadership in Energy and Environmental Design (LEED):** The most extensively used green building rating system in the world is LEED (Leadership in Energy and Environmental Design). LEED certification is available for all types of buildings and phases of development, including building builds, interior fit-outs, maintenance and operation, and core and shell.
7. **Indian Green Building Council (IGBC):** IGBC was formed in the year 2001 by the Confederation of Indian Industry with the main objective of facilitating India to have a sustainable built environment by 2025 and India to become a global leader in a sustainable built environment.
8. **Green Rating for Integrated Habitat Assessment (GRIHA):** Green Rating for Integrated Habitat Assessment aims to keep a building's consumption of resources, waste output, and natural environmental effect to a minimum, based on nationally accepted norms and guidelines.

Green Library Elements used in Green Building

Building Area

India's population is diverse not just in its dialects, cultures, and traditions, but also in its locale, climate, and geography. So, before building a constructional setup, the institutional head's most significant responsibility

is to consider all sides' benefits and drawbacks, exactly as separate plans for a hilly area and a plain area setup.

Community and Locality of Building

The library is the beating heart of any institution, university, or department; it should be located in an ideal location, away from sources of noise such as clubs, auditoriums, and entertainment halls, in order for patrons to focus on their studies. The use of public transit to get to the library is an important factor to consider when selecting a site. Different agencies and organizations, such as LEED and the US Green Building Council, have provided numerous guidelines for developing world-class green libraries.

Constructional Material of Building

There are many guidelines and regulations in India and elsewhere for constructing green buildings with recyclable and environmentally friendly materials. Green library building material should be such that there is no harm to our environment and it can be used again.

Water Conservation

A library should plan in a proper water availability area for a good sanitation system, which will keep the library clean, green, and healthy. Drinking water is one of the natural resources that are diminishing in quantity; hence it has become the responsibility of every human being to conserve drinking water. A library can utilize sewage and rainwater in plantations, harvesting, and flushing in toilets by checking into the topic.

Role of Green Librarian in green Library

1. Librarians should strive to create an eco-friendly library system and help everyone who is recognized or interested in this work that help environment.
2. Librarians should try to promote green library movements using various social media tools
3. Librarian can promote by not using carbon footprint in his library
4. Librarians can also make people aware of the green library through seminars, conferences, and various platforms.
5. By using of Solar panel and solar lights in library
6. By using wooden furniture in the library and all the items of use which are made of wood by use of the electronic resources in the place of paper
7. Librarians should make library users aware of the 3R system

Conclusion

As we all know that library is a growing organization but there is a budget to develop it and space are two important factors without fulfilling which our library cannot grow. Starting of green concept many of the problems remove in this area. before the advent of the green library, concept librarian faces many problems related to budget and space after that green concept came all problems are removed Now most of the libraries are supporting e-resources instead of paper resources, using rainwater to clean libraries and washrooms, saving electricity by using solar lights, reducing carbon footprint, etc. so we can say that the green library will prove useful in view of today's time and it is inclination of library to sustainable library.

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5

Use of Digital Marketing Techniques in Libraries

Dr. P.S. Rajput & Mr. Deepak Sharma

Abstract

Digital marketing has come into existence in the last decade of 20th century. With the rapid growth of internet users in last 20 years, digital marketing techniques become very important for organizations. Now it is essential to have websites and social media accounts for connecting with the users. Digital marketing with their powerful techniques has so many capabilities which can help organizations like libraries to optimally use the available resources. It can further help to know the user preferences and their locations. Since libraries are facing so many challenges like budget cuts, downfall in usage and decreasing foot counts, these digital marketing techniques can help libraries to revamp their image and understand the users in a better way.

Keyword: *Digital Marketing, social media, Blogger, Websites, Search Engine Optimization (SEO)*

Introduction

Marketing techniques are very important for any organization. Lake1 defined, "Marketing is the process of teaching consumers because they should choose your product or service over your competitors. The key is finding the right marketing method and defining the right marketing message to use to educate and influence your consumers". Martin2 on the view that, "Marketing is simplistically defined as putting the right product in the right place, at the right price, at the right time".

Till few years back, it was the perception that marketing is only used for increasing the sales and profits. But it is not the reality and many of the not-

for-profit organizations are also using marketing strategies for promotion and reaching to the users. Bendapudi[3] (1996) stated that "Over the past decades, non-profit organizations have slowly been introducing marketing into their activities, realizing that it may help them achieve their organization's mission and as nonprofits are challenged by more complicated decisions than for-profit organizations survival is dependent on careful application of marketing management tools". Marketing is not only used for profits and increase in sales but also to know the return on investment (RoI). Many not-for-profit organizations use marketing to reach to the user and justify the expenditures occurred on providing the services. Libraries and information centers are also considered as not-for-profit organizations as no direct monetary benefit is associated with the libraries. Hiremath[4] (2003) stated that "It has become imperative that the tools of marketing are very much essential in the current fast changing and highly competitive environment. Libraries and information centers that are involved in handling information to facilitate decision-making are no exception to it". Although the main aim of libraries is to support the learning process of the organization and build rich and resourceful library. Whatsoever is the case without funds no library can work efficiently. The management wants to know about the proper utilization of funds. Marketing techniques can help libraries to showcase their usability. Few years ago in a traditional scenario, it was a quite difficult task for any organization to provide their RoI details because there was no technique to measure the usage. Marketing techniques were there but the impact of marketing cannot be measured directly unless a drastic increase or decrease is noticed in sales or services. With the advent of technology and internet the concept of digital marketing has emerged and changed the connect of marketing in all fields all over the world.

Digital marketing techniques can help libraries to reach to the potential users and further to know their preferences and interests. Moreover, these digital marketing techniques are very easy to learn. Any professional with basic knowledge of internet, social media and website management tools can use these techniques in libraries. Many of the organizations are using these digital marketing tools very effectively and have seen tremendous growth in terms of increase in usage of resources and footfalls in libraries.

What is Digital Marketing?

Digital marketing or online marketing is the form of marketing in which the activities happened through electronic devices like computer, laptop, or mobile phones. American Marketing Association[5] defined, "In a nutshell, digital marketing refers to any marketing methods conducted through electronic devices. This includes online marketing efforts conducted on the internet. In the process of conducting digital marketing, a business might

leverage websites, search engines, blogs, social media, video, email, and similar channels to reach customers". According to Chris[6], "Digital marketing is a form of marketing for promoting and selling products or services on the Internet. It's the process of leveraging different online marketing channels like search engines, social media networks, and email to reach your target audience".

In above definitions it is clear now that digital marketing is an online tool of marketing which happened through various internet tools. These digital marketing tools can be very useful for libraries. Most of the digital marketing tools are free to use. Library professionals can learn these tools online and make use of all these in libraries. The main tools of digital marketing are e-mail marketing, search engine optimizations, social media marketing, affiliate marketing, content marketing, website marketing, video marketing and blogging etc.

Difference between Traditional Marketing v/s Digital Marketing

Traditional Marketing	Digital Marketing
Traditional Methods of marketing like print newspaper and magazine, hoarding and face to face marketing	Online marketing through search engines, websites, email, and social media
It involves a high cost	It is very cost effective and very less investment is required
It has a limited visibility and requires a lot of time and energy	It has a wider visibility and very quick and fast
Not possible to measure Return on Investment (RoI)	It provides a detailed analysis on every aspect and RoI can be measured effectively
No tweaking or change is possible	Change and tweaking is possible at every level
One way communication, users cannot give any inputs	Two-way communication, Users can give instant feedback
No options of User categories and users are forced to see the advertisement	User categories can be created and advertisement will be shared only if user opted for it

Need of Digital Marketing in Libraries and Information Centers

Library and information centers are providing many services and facilities to its users. Every year millions of rupees have been spent on the resources and facilities. What the question whether the resources added by libraries are relevant or useful always asked to the Librarian. Gupta[7] described, "Libraries are facing serious competition from commercial information services providers which essentially use the resources available from libraries and analyze and repackage the same for customized use by the clients and online resources are emerging in a big way that will question the role and form of libraries in future".

Digital marketing techniques can help libraries to know the requirement of users and justify the expenditure occurred on maintaining the resources. In another statement Mercado defined that, "globalization and liberalization effects are rapidly changing this scenario altogether. Librarians are asked to downsize, economize, and streamline, while they are simultaneously expected to provide the fastest, latest, and most expensive hardware and software to make the information marketplace accessible".

All the above discussion is enough to understand that until unless the library professional make strategy to reach out to the user, to know the actual user requirement, to know whether the existing resources are helping users to get the desired information, libraries continue to face challenges from their parent organizations.

Digital marketing techniques are such type of tool which can help libraries to make good strategy and spend on the right resources and make the users as well as the administrators happy. Enough content is available on internet which can help library professional to learn the digital marketing techniques.

What are Various Digital Marketing Techniques?

There are many digital marketing techniques which can be used by libraries. These techniques are easy to download and operate. The details about the important techniques of digital marketing are as under:

Website

Website is the most important tool of any digital marketing strategy. Website is a must requirement for further use of any kind of strategy. There are two ways to design a website. The first way is to design a website through proper coding using HTML, PHP, JAVA, and other languages. Since developing website through coding is only possible if a person has sound technical knowledge. Another way to develop website is use of any open source fully customized tools. WordPress and Joomla are very common and widely used open-source website content management system. Anyone can use these tools with basic computer knowledge. Website is the first step towards using other digital marketing strategies because all the online traffic will first land on your website.

Blogging

Blog is also a kind of a content management system which is a very powerful tool for marketing. Libraries can create their blog and send regular updates about library. The advantages of Blog are you can share text, video and images, users may also comment on your post and give feedback. Blogger has

its own built-in analytics tools that help users identify where their audience is coming from and what they're interested in.

E-mail Marketing

E-mail marketing as the name suggests, a tool where users can be contacted through e-mail. Many of the times all of us received so many marketing e-mails on our inbox like any update, any feedback or order conformation. There are so many open-source tools available on internet which can help to design various themes and templates for e-mail. Mailchimp, beefree and unlayer are some of the popular e-mail template and theme builder tools. Libraries can use these templates to send users information like new additions in library, important databases available in library, a daily news digest etc.

Social Media Marketing

Social media is very popular among people of all ages. It is the most important tool for marketing. The biggest advantage of social media is it is totally free to use. It is very easy to use social media. Libraries can create their social media pages and share with all the users. It is also the fastest way to reach to the users. All types of images, text and videos can be shared. Facebook, Instagram, Twitter and Linkedin are few examples of social media platforms.

Search engine optimization

Search engine optimization (SEO) is the most important term in the digital marketing world. As the name suggests it is a technique to know the interest of the users. Whenever any user runs a query on the search engine, it automatically records all the activities. It allows organizations to know the preference of the consumers and make their products accordingly. Many of the users runs so many searchers on the google about various online resources available. Libraries can check all these search results with their simple mail account. Apart from google there are so many other tools are also available which can help libraries to fulfill their purpose.

Benefits of Digital Marketing

1. It can help libraries to procure the resources as per the actual requirement of the users.
2. It is the best way to give the publicity to the existing resources.
3. It will help to increase the user loyalty with frequent communication
4. Social media helps connecting to the users easily. It is the best way to send them the updates about the library development and new additions.

5. Tracking of visitors who visit the website and other online tools. It will help libraries to review their resources and services.
6. Libraries can take instant feedback

Conclusion

Digital marketing is the need of the hour. Libraries are under huge pressure because of the budget cuts and decreasing usage of resources. Digital marketing can help libraries to procure the resources after knowing the user preferences. It is the best way to connect with the users and available free of cost or on a very nominal cost. Library professionals should develop library websites and social media pages for wider visibility. The advantages like tracking and monitoring, user count, user preferences, instant feedback can be very useful for libraries.

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6

Impact of Big Data on Library Services: A Recent Approach

Dr. Bal Ram & Dr. Mahender Pratap Singh

Abstract

Big data is a concept of database where we have store large amount of data with maintaining the velocity, veracity and volume of data. In the field of library science, we need a large amount of data stored in database, such data has contained journals and books, details of library, millions of data comes from institutions. Both types of data can be processed in library first one is structured data and second one is non structured data. Big data ply a very important role in the field of library science. It's describing a very big level of both controlled and unstructured data that is so large. It is very difficult to process with traditional software techniques that's why we used the concept of big data. In this paper I will discuss about the concept of big data and why big data is important in the field of library science.

***Keywords**: Big data, structured data, unstructured data, library science, velocity, veracity and volume of data.*

Introduction

Big data is a concept of analyzing data sets that are too large whose not processed from traditional software techniques and tools Big records evaluation demanding situations consist of taking pictures records, records garage, records sharing, storing, transfer, visualizing, updating, data privatives and records source [1]. In educational libraries, Big Data analytics is laid low with simple demanding situations: first, because of the large volume, selection, and velocity of the expertise concerned, the garage and system desires of the device are as a substitute overwhelming, and second, the analytics strategies

and algorithms are complicated, which makes Big Data analytics a computing-extensive task [2]. For supporting of processing of data and storage using cloud infrastructure for appropriate infrastructural resolution. Cloud computing suggested the storing, managing and analysis big data functions on the large cloud server. Cloud provided thousand of servers on the cloud for processing and storing the data of the organizations. Its maintains the structured and unstructured data but in big data processing main focus on unstructured data because its complexity [3]. In the library organization data is available in the form of bits, bytes, tables (large amount of data), these types of data is so difficult managing from traditional way. Big data can used tools and techniques for analyzing and storing data with better utilization of space, cost effective, and less massive of data with high velocity.

Literature Review

Big data is a discipline that treats methods to analyze, systematically extract data from, or in any other case address records units which are too massive or complicated to be treated via way of means of conventional records-processing software software. Data with many fields (columns) provide more statistical power, at the same time as records with better complexity might also additionally result in a better fake discovery rate [4]. According to Gartner Group Inc. Big data as "high volume, high velocity, and/or high variety information assets that require new forms of processing to enable enhanced decision making, insight discovery and process optimization." [5]

Big data is described by following characteristics. These are as follows:

1. **Volume:** The size of data is too larger in big data in compare of normal data size. Firstly, decided data is under big data sets or not by the size of data. Which data cannot be stored and analyzed by system software and hardware these types of data comes under big data. Traditional software considered only data in kilobytes and megabytes but big data considered data in the size of terabytes and petabytes.
2. **Velocity:** velocity is directly related to speed. Data is travel which speed in the path of growth and development relates to the velocity. Big data is to be had in actual time. Two styles of speed associated with large records are the frequency of era and the frequency of handling, recording, and publishing. [6]
3. **Variety:** A Variety word refers to the type and nature of the data. Earlier RDBMs (Relational database management system) capable to handle structured data effectively. But now, change nature of data from structured to semi-structured or unstructured cannot processed by traditional tools and technology advanced with the top goal to capture, store, and manner the semi-based and unstructured (variety)

statistics generated with excessive speed (velocity), and big in size (volume). Later, those gear and technology have been explored and used for coping with based statistics additionally however superior for storage.

Diversity of information retrieved from heterogeneous sources with diverse forms and formats. Also, user need is also getting diversified with libraries serving heterogeneous population with diverse subject's and interdisciplinary research.[7]

4. **Veracity:** The reliability of data is decided to the data quality and data value. Reliability means accuracy, authentic and credible; these types of information reduce to inconsistency and uncertainty.
5. **Value:** Value can be measured by an assessment of the other qualities of big data. Enabling & empowering users to be able to convert information into something useful and valuable.
6. **Variability:** It is totally changed from the veracity. With time the meaning, value, validity, visualization of same Big Data file changes, which have a huge impact on data homogenization.

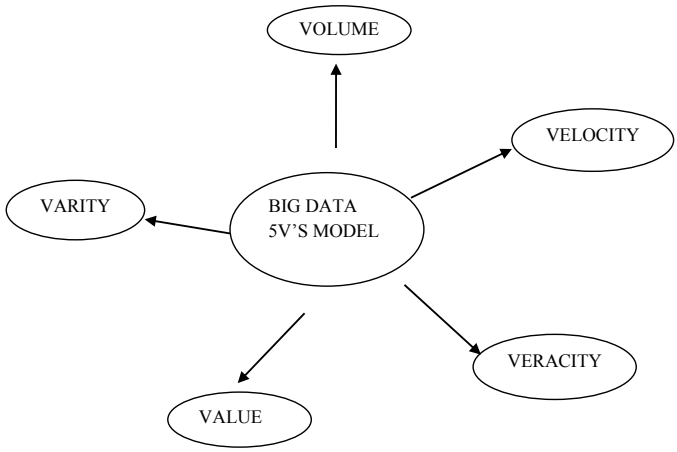

Figure 1: Characteristics of Big data

Big Data Analyzing Tools and Techniques

Big data used various types of tools and techniques in managing and storing the data of libraries. These are as follows:

Analyzing tools: To implemented big data library firstly required the powerful tools for handling and analyzing enormous types of data. Big Data gear may be classified into 3 sorts of paradigms consistent with the form of evaluation. The first kind is batch evaluation in which information are first

filtered after which analyzed. The 2nd kind entails the circulation manner which analyzes information as currently as plausible to derive its results. The Third type worries interactive evaluation which tactics the information, permitting customers to adopt their personal evaluation of information [8] [9]. Here most ten powerful tools listed below:

- Splice machine
- MarkLogic
- Google Chart
- SAP in memory
- Cambridge in semantics
- MongoDB
- Pentaho
- Talend
- Tableau
- Splunk

Big Data Techniques

- Various Big data techniques are as follows:
- Statistical techniques.
- Machine learning techniques.
- Data mining techniques.
- Signal processing techniques.
- Visualization techniques.

Big Data in Academic Libraries

Big data plays very important role in academic libraries in the field of managing, retrieving and storing the large amount of data sets. Data set is a collection of data. Data can be in the form of structure, semi structured and unstructured. Big data deals with the complex data means big size of data. Data extraction has 3 stressful conditions: accuracy, insurance, and scalability. As the accuracy of statistics extraction strategies immediately impacts statistical quality, it's far very important to attain accuracy as lots as possible. Coverage relies upon on precision, that's as critical as extracting right systems. Evidently, scalability is a undertaking precise to huge scholarly statistics because of the huge quantity of records to be processed [10] Map Reduce serves as a beneficial and viable programming paradigm for handling the problem in scalability. Metadata, creator statistics, citations, and sections with extra facts are the 4 sorts of records that want to be extracted from scholarly

facts. Big statistical datasets for instructional libraries to beautify the overall performance of library and services.

Big Data generation makes it less difficult to paintings with large datasets, link particular datasets, find patterns in actual time, expect results, adopt dynamic chance scoring, and take a look at hypotheses. In contrast, each libraries and librarians are uniquely best for working with huge statistics. Libraries have an extended lifestyle of being statistics handlers and era adopters, and Big Data desires aren't any exception [11].

For libraries, statistics repository is an exemplary manner to offer truth to its customers or even to have manipulated over the records produced thru the academy. The burgeoning discipline of statistics offerings in libraries, collectively with advanced expert options for records specialists, indicates the necessities for brand spanking new abilities and schooling for such truth-particular roles. While those new roles call for superior technical intelligence, statistics should be considered as a hard and fast to be protected within side the library's cadre of sources [12].

Benefits of Big Data in Library Science

1. Big data can used for plans for creating massive information provider departments.
2. Big data work with large data sets, hyperlink exceptional dataset, locate pattern in real time.
3. Resource libraries studying their postings, benchmark towards the postings of other libraries.
4. Make intelligent, data-driven decisions in libraries.

Conclusion

In recent years, libraries offering online services and resources to their users. Day by day collection of articles, magazines, data are increased in database. So big data handle the large amount of data very effectively without any inconvenience. Libraries also stared online media for promoting their services and sources. Online information need to analyze to check their authenticity & accuracy with emerging technology and provide them to particular targeted user-base for adding value to their services. Moreover, to "walk with the footprints" of new age information-inflation, Big Data can help libraries in better decision making, regarding demand-driven collection development, library space management & usage tracking. Big Data also helps in maintaining quality among regular & repetitive library works, viz. cataloguing, indexing, archiving. management, preservation & representation works. At last, big data can make library most cost-effective, convenience, innovative and user friendly.

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7

Open Access Scholarly Communication: An Overview

Sana Aslam & Dr. Sharad Kumar Sonkar

Abstract

Open access, which refers to the free distribution of scientific content over the Internet, is a new way to gain more widespread and unrestricted access to scholarly literature. Scholarly communication via open access journals and self-archiving are the two main ways to open access publishing. The conventional scholarly network infrastructure has been openly challenged by the Open Access movement of the past decade, as well as digital libraries built by universities and library services as part of that initiative. This article looks at open-access scholarly communication and summarizes a growing collection of research on academics' reactions to institutional repositories. This research explored the historical perspectives and methods of scholarly communication, scientific culture and scientific scholarship. To promote the communication of research output from institutions, the paper suggests that public universities and other research institutes in the country explore establishing institutional repositories with suitable monitoring and assessment.

Keywords: *Open Access, Scholarly Communication, Journals, Research Process, Publication.*

Introduction

Scholarly communication can be divided into two categories. The open access concept and the traditional subscription-based model. According to Budapest Open Access Initiative (BOAI) (2002) and Public Library of Science (PLoS) (2005), Open Access (OA) is defined as "the free availability of publications on the open network, allowing any user to peruse, browse,

copy, allocate, print, search, or connect to the documents of these publications, scoot them for indexing, pass them as data to software, or use them for any other valid reason without financial, contractual, or technical barriers other than those indispensable from obtaining internet access on its own." Because most research is supported by government funding collected from taxpayers, open access availability of research literature has been deemed extremely vital to the public. As a result, taxpayers have a right to see the results of what they have sponsored.

Accessing and sharing intellectual knowledge is a big issue in India and other developing countries. Due to a lack of money, researchers are unable to access all of the most current subscription-based scholarly information. Because most research in India is not supported, researchers are unable to pay article processing charges (APCs) for publishing their findings in open-access journals. The majority of research outcomes are documented as grey literature or in local journals with minimal circulation, resulting in low awareness of research output emerging from Indian universities and research centres in particular. Despite the obvious advantages for open access to overcome the aforementioned issues, India has yet to fully embrace this style of scholarly communication.

In scholarly publication, open access is a leading light. Also, some subscription-based publications are now giving a payment-based option for publishing articles, and many completely open access journals are now available to researchers, providing support to research and academic institutions that can no longer afford growing journal subscription fees. However, if completely open-access journals are to become a suitable option for scholarly communication, they must first be properly recognized by the scholarly institution. Despite the many benefits of open access publishing for scholars and researchers, few are interested in learning about it and submitting their research to open access journals.

This paper is briefly discussed about the open access and their types, scholarly communications followed by historical perspectives and methods of scholarly communication, scientific culture and scientific scholarship.

Open access (OA)

The term "open" refers to a shift in how the author and publisher negotiate publication, while "access" refers to the audience's ability to get the publication. The open access initiative aims to make material available on the internet more approachable, valuable, and reused by removing legal, financial, and technological barriers. Due to the value and effectiveness of information, it is critical to ensure that it is spread as broadly as possible and that any barriers to receiving it are lowered, if not abolished completely. The open access movement is still trying to find a way of making such happen.

The Max Planck Society in Germany held a meeting in October 2003 on

"Open Access to Knowledge in the Sciences and Humanities." The Berlin Declaration on Open Access was born out of this meeting, which broadened the topic to include the sciences.

Communication of scientific research findings is, without a doubt, a major activity, if not the raison d'être, of many scholarly societies. One of the key options for improving the knowledge and practice of a society's specialty field or sub-branch is to publish periodicals. The most essential participants are societies. They are extensively involved in academic journal publication and are very close to the scholarly world, as they have been for a long time.

Peer review, limited submission conditions, and other distinguished publication characteristics are regardless of the magazine's availability. Some open-access journals maintain the greatest quality assurance requirements, while others publish minimal material, and vice versa. Open access reduces price barriers and uses the Internet's authority to make it easier for users to access works. Some authors find that open access enhances their readership as a result of the enhanced accessibility and visibility. The vast majority of research show that open access leads to more citations.

There are three types of OA platforms: green, golden, and hybrid.

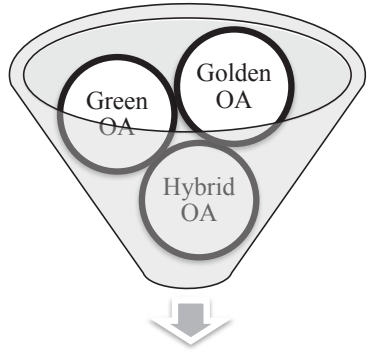

Figure 1: Types of Open Access (OA)

1. **Green OA:** The self-archiving of published or pre-publication content for public free usage is referred to as green open access publishing. With publisher permission, authors make preprints or post-prints of their works available in an organizational or interdisciplinary digital repository. Academies develop repositories for their own research through the "Green Route" of open access, which are made open after an acceptable suspension agreed period upon with publishers. As a result, green open access often applies to an article after it has been published.
2. **Gold OA:** Works published in an open access journal and accessible via the journal or publisher's website are referred to as gold open

access publishing. The Gold Route entails publishing in an open access journal, which therefore performs the same distribution and archiving services as traditional financing publishers. This type of publishing is supported by grants from the government, societies, and institutions, as well as by charging writers a refundable fee, known as an article processing charge (APC).

3. **Hybrid OA:** Gold open access is usually connected with hybrid open access publication. It occurs in journals that provide authors with the opportunity of making their articles open access in exchange for a charge. Individual papers in hybrid journals are readily available for a price in exchange for a subscription. The price is paid to the publisher or journal by the author, the author's organisation, or the research funder in Hybrid Open Access publishing, also known as Paid Open Access.

Scholarly Communication

Scholars and academicians use specific communication channels to conduct scholarly communications. Academic journals, conference papers, research monographs, dissertations, research reports, and personal biographies are the most prominent. The Internet has made communication much easier and more rapid. Any sort of communication benefits from social media. Learned societies have been partnering with for-profit publications to achieve greater outreach, global readership, and global authorship since the mid-twentieth century. In comparison to the former print-only age, the Information and communication technology environment aids in the global dissemination of academic articles more quickly. When scholarly literature became internationally and instantly accessible through the official website in globally connected organisations, scholarly communications took off like a rocket. Scholarly communication refers to the process of academics and researchers exchanging, publishing, and distributing research results so that the ensuing academic content can be shared with the world's research community. A research report is a typical manner of publishing one's research outcomes in related to particular research problem, using scientific methods such as experiments, observations, and analysis techniques.

Historical Perspectives on Scholarly Communications

Traditionally, academic societies and their member communities all over the world have been driving scholarly publications by publishing the findings of their research questions and scientific advances. Scholarly journals were primarily promoted and published by learned societies. In the seventeenth and eighteenth centuries, around the time of the Renaissance Era, the first learned societies arose in several European countries.

The following are some of the oldest scholarly publications in the world:

- The Journal des Sçavans was the first scholarly journal in Europe to be published. The first issue was published on January 5, 1665. It was formed by Denis de Sallo, a French adviser to the Parisian Parliament. The journal is now known as the Journal des Savants (ISSN: 0021-8103).
- The Philosophical Proceedings of the Royal Society (Phil. Trans.) was the Royal Society of London's second-earliest scholarly periodical produced in Europe. On March 6, 1665, the first issue of the first volume was published. The Philosophical Transactions of the Royal Society 1: Mathematical, Physical, and Engineering Sciences (ISSN: 1364-503X) and the Philosophical Transactions of the Royal Society 2: Biological Sciences (ISSN: 0962-8436) are the two portions that are now published.
- The American Publication of Science (AJS) (ISSN: 0002-9599) was the first scientific journal published in the United States, having been created in 1818. It has been consistently published since 1818.
- The Asiatic Society, India's first intellectual publication published in Asia, published the Asiatick Researches, or Proceedings of the Society Instituted in Bengal, for Inquiring into the History and Antiquities, the Arts, Sciences, and Literature of Asia. In 1788, the first volume was published. It is one of the world's oldest scholarly periodicals. The Journal of the Asiatic Society is now the name of the journal (ISSN: 0368-3303).

The Method of Scholarly Communications

Scholarly communication is just one part of a bigger research process. The researchers contributed to the progress of knowledge by taking part in collaborative scientific research initiatives, particularly by organizing their research in collaboration with their research partners, sponsors, and organizational research groups. A group of researchers develops research concepts, which are then refined by their research institutions and other staff members. The research director and team leaders are active in the report creation and communication of the collaborative study findings here. To reach a wider audience, this research team can use any of the academic channels of communication available, such as journals, conference proceedings, and research monographs.

The research team is also in charge of writing a high-quality report that will be used to communicate with the funding agency and other participants, as well as kick-starting any follow-up research initiatives. The study data that is generated or collected must also be preserved in order to be reused or repurposed in future research endeavours. The Research workflow then

repeats itself in order to tackle some of the relevant research problems and push knowledge forward.

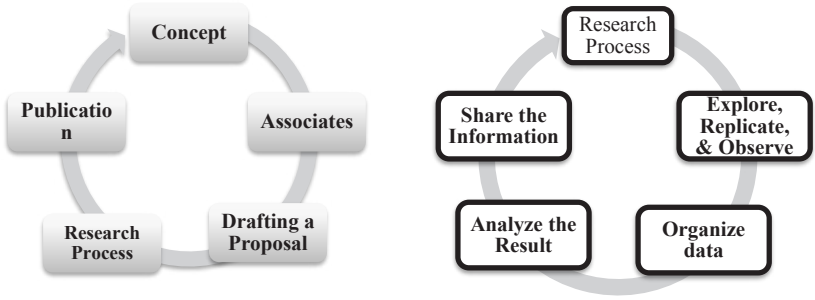

Figure 2: Research workflow.

Researchers have a variety of options for academic communication. Scholarly magazines are the most common form of scholarly communication. This quarterly publication channel has a high level of academic significance, qualifications, quality management, affordability, and outreach possibilities in the scientific community.

The papers presented at the conference may be published before or after the event. Many conferences now co-publish delivered papers in online proceedings, which are accessible through professional publishers' knowledge portals.

Research monographs are also a viable method for disseminating research findings. Some books are compilations of chapters produced by various authors, with each chapter serving as a type of research paper, displaying a specific amount of study findings.

Theses and dissertations are institutional formats of scholarly communication used to preserve and distribute the findings of doctorate and master's level research investigations conducted by students enrolled in higher educational universities and institutions. Publicly supported doctoral dissertations are made available in some countries through institutional or national electronic theses and dissertations repositories (ETD). One such national system in India is the Shodhganga project of the INFLIBNET Centre.

Working papers are scientific articles that are intended to share the results of ongoing research. Working papers allow researchers to receive qualitative and rapid feedback while making modifications to their research strategy or data analysis.

Patents are a mechanism for securing intellectual property rights arising from scientific research or inventions. A new product, service, or procedure that is the result of scientific research and has specific uses for the improvement of human life is patentable, and creators can claim it as their intellectual

property by submitting it with patenting authority and completing particular legal processes.

Research reports and technical reports are professional forms of research communication that are used to document and distribute research findings to sponsoring members and stakeholders method of data analysis. Publicly sponsored project reports are prepared accessible in the public domain in several countries through internet open access.

Figure 3 reveals that different medium of scholarly communications. Original sources, initial sources, and primary literature are all terms used to describe various types of scholarly communication.

1. Academic Journals
2. Conference Proceedings
3. Research Monographs
4. Theses and Dissertations
5. Working Papers
6. Patents/Standards
7. Research Rreports

Figure 3: Different Medium of Scholarly Communications

Figure 4 depicts the many types of publications that have been published in scholarly journals. Research papers, systematic review, research publications, and brief communications are the most common categories. Feature articles based on the theme of a special issue are published in some academic publications. Book reviews, editorial or analysis papers, observations or perspective papers, events or opinions, and symposium reports are all common forms of articles. Editorials are published on a regular basis in many journals to convey editorial viewpoints on journal-specific topics, the research framework, or topical problems as a result.

1. Research Papers
2. Systematic Review
3. Research Publications
4. Brief Communications
5. Book Reviews
6. Editorial or Analysis Papers
7. Observations or Perspective Papers
8. Events or Opinions Papers
9. Symposium Reports
10. Visualization Paper

Figure 4: Types of paper published in academic articles

Conclusion

The success of open access will be determined primarily by two aspects: financial services and contributions to scholarly communication. Almost all libraries, universities, research organisations, and publishers have begun to promote or adapt to a new scholarly communication environment based on OA, repositories, and pre-prints. Some of these mediums are referred to be primary sources because they contain first-hand experience or specific proof about a subject under research. There are other source documents to consider. Indexing and abstracting services are often secondary sources that aid academic academics in conducting proper searches and locating original literature in scholarly journals and other relevant research publications. Historically, academic organisations and other intellectual communities started scientific publications to publish the findings of completed research work or scientific discoveries. A large number of for-profit organizations have begun to publish scientific publications. The emergence of interactive online databases and online gateways of primary literature marks arrival of personalized web-based services for disseminating scholarly literature to global researchers, institutions and prospective authors.

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Scholarly Open Access Resources – An Overview

Sahil Bains

Abstract

It is now well recognized that knowledge plays a crucial role in economic growth, social development, cultural enrichment and democratic empowerment. To build inclusive knowledge societies, it is important to bridge knowledge gap through Open Access (OA) across the world. Scholarly information is the significant output of a researcher and an important resource. The worldwide online availability of scholarly information (OA) to everyone, free of most copyright barriers and licensing is a key aspect for global knowledge flow, innovation and socio-economic development. This paper serves as a resource guide and as a gateway to various resources available under the Open Access Initiative. It will enable the readers to identify and access a number of national and international scholarly resources for their scholarly information needs.

Keywords: *Electronic resources, Online resources, Open access, Open access resources, Scholarly information*

Introduction

Open-access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions. Open Access Resources are available in various forms and types such as e- journals, e-books, Electronic Theses & Dissertations, Directories, e-print archives, digital repositories, open education resources, search engines and blogs etc. All these resources are scholarly and useful to support our academic and research work and are available on the web. Most of these are free, and can be accessed without any restrictions at the user end. Because OA uses copyright-holder consent or the expiration of copyright, it does not require the reform, abolition, or infringement of copyright law. OA

gives the contributors of the work a worldwide audience and demonstrably increases the visibility and impact of their work. It accelerates not only research but the translation of research but useful technologies, solved problems, and informed decisions that benefit everyone.

Benefits of Open Access (OA)

1. OA eliminates barriers related to permission (most copyright and licensing restrictions) and price (licensing fees, subscriptions, and pay-per-view fees).
2. OA increases the visibility and impact of the research work globally.
3. As OA gives barrier-free access to the literature needed for research, it increases reader reach and retrieval by facilitating full-text searching, indexing, translating, etc.
4. OA provides collaborative opportunities and promotes knowledge economy and contributes to economic boost.
5. The outcomes of a research can be made available instantly to the global audience.

The Open Access Resources outlined in this paper are as follow:

- Open Access Encyclopaedia
- Electronic Books
- Bibliographic Databases
- Open Access Directories
- Electronic Journals
- Open Access E-Print Archives

Encyclopaedias

Wikipedia

Wikipedia is the free online encyclopaedia that currently consists of 57 million articles in more than 300 languages. It is based on project to share knowledge freely that can be edited by anyone and is hosted by a not-for-profit organization, the Wikimedia Foundation. It is the largest online reference website in the world. It is updated regularly to improve its quality and rectify errors and misinformation.

Stanford Encyclopaedia of Philosophy

The Stanford Encyclopaedia of Philosophy features open access scholarly resources and its each entry is maintained and kept updated by an experts group. The entries are referred before they are made available to the public

maintaining academic standards. Currently it is copyright by the Metaphysics Research Lab, Dept. of Philosophy, Stanford University.

New World Encyclopaedia

The New World Encyclopaedia is a free online encyclopaedia designed for general people, available to anyone with internet access. It consists of thousands of articles selected carefully about consistency and quality for use by students, scholars and teachers with benefits of careful editorial supervision and open access.

Encyclopaedia of Mathematics

The Encyclopaedia of Mathematics is designed specifically for the Mathematics community and is an open access resource with over 8,000 entries in the field of mathematics. It is published by EMS Press, a Berlin based publisher owned by European Mathematical Society. Previously, it was owned by Springer Verlag.

Encyclopaedia.com

Encyclopaedia.com is the world's number one encyclopaedia where we can search from numerous individual encyclopaedias and reference books from the most trusted publishers from the world such as Oxford University Press, Columbia University Press, Cengage, etc. It offers free access to more than 3 lakh sources to cite and also features content in the form of articles, newspapers, magazines, topic summaries, pictures and videos.

Electronic Books

Digital Library of India

The Digital Library of India (should not be confused with NDLI) was initiated under the Million Books Project to digitize and host all the significant works published in India. The texts are useful from historical perspective. Since 2017, its website has not been functional; the contents can be viewed at https://archive.org

E-Books Directory

E-books directory is a free service in the form of a web resource containing an evolving list of links to freely accessible electronic books, articles, lecture notes and other documents all over the internet. It currently offers free access to about 10,817 e-books in about 709 categories.

DOAB

Directory of Open Access Books (DOAB) is a joint service of OAPEN (Open Access Publishing in European Networks), OpenEdition- a portal for electronic resources in humanities and social sciences, CNRS- the French Centre for Scientific Research (French: Centre national de la recherché scientifique) and Aix-Marseille University, supported by DOAB Foundation. It is a discovery service that indexes and offers access to high quality and peer reviewed open access books. Its purpose is to increase the discoverability of open access books to maximize visibility, dissemination and impact.

HathiTrust Digital Library

HathiTrust Digital Library is a preservation repository that provides preservation and access services to digitized content from multiple sources including internet archives, and in-house member institutes. It offers a collection of millions of titles digitized from libraries and information centres over the world, partnering with academic and research institutions. The items in the digital library are available in full-view to public and are searchable and held in copyright. One can perform advanced catalog search and advanced full text search to find the desired title.

MERLOT

Multimedia Educational Resource for Learning and Online Teaching (MERLOT) is a program of California State University Long Beach partnered with educational institutions, professional societies and industry to enable the formation of communities engaged in developing shared knowledge base of learning resources. The MERLOT collection consists of numerous discipline specific learning materials, web pages, bookmark collections, etc. to enhance the learning experience.

Million Books Project

The Million Books Project is an internet archive of early collections of books from Indian scanning centres of the Universal Library Project, also called as Million Books Project. The project was led by Carnegie Mellon University to digitize a million books to make them accessible online, most of which were not in good shape.

Project Gutenberg

Project Gutenberg is a library of about 60,000 freely accessible electronic books. It does not require any registration; everything is free to the readers. One can voluntarily donate to help the project in digitizing more books and

maintenance. Project Gutenberg e-books doesn't require any special apps to read e-books. One can find books by using search and browse option by author, language, popularity, subject, title, type, etc.

World eBook Library

World eBook Library offers collection of millions of works of the last 1,000 years by prominent thinkers from all over the world in more than 300 different languages. After registering for e-Library card, one can read online or download and save files anytime from anywhere. The library's collection consists of academic and scholarly articles from every field of study with an extra focus on education, sociology, science and technology.

Bibliographic Databases

ChEMBL

ChEMBL is a database of chemistry resources and bioactive molecules. It is a part of EMBL (European Molecular Biology Laboratory), an international interdisciplinary and innovative research organisation. Situated on the Wellcome Genome Campus in Hinxton, Cambridge (UK), it is world's one of the largest expertise in genomics. Apart from the database, there is a repository for open access chemistry resources called as ChEMBL NTD and thematic portals for users with a particular research focus. Another such resource is UniChem that is a simple system that creates cross references among different databases.

ChemSpider

ChemSpider is a free database of chemical structures that provides access to over 100 million chemical structures from different data sources. It is a part of the Royal Society of Chemistry and managed by a team of curators having extensive experience.

ERIC

ERIC (Education Resources Information Centre) database offers access to over one and a half million educational resources and literature. It is sponsored by the Institute of Education Sciences (IES) of U.S. Department of Education.

Indian Science Abstracts

Published by CSIR-NISCAIR, India, Indian Science Abstracts (ISA) is a bibliographical database of scientific Indian literature. The database can be

searched using different parameters like title, subject, document type, author name, journal name, keywords, etc.

IndMED

IndMED is an online bibliographic database designed and developed by the ICMR-NIC Centre for Biomedical Information known as Indian Medlars Centre (IMC) jointly set up by National Informatics Centre (NIC) and Indian Council of Medical Research (ICMR) that covers selected and prominent peer reviewed 100 medical journals published in India.

PubMed

PubMed is a free database that primarily comprises of abstracts and references on biomedical and life sciences topics with more than 33 million citations. The database is maintained at The National Library of Medicine, National Centre for Biotechnology Information, Rockville Pike, Bethesda, MD, USA.

Open Access Directories

OpenDOAR

OpenDOAR is the global directory of Open Access Repositories. It is quality assured repository where one can search thousands of repositories providing free and open access to quality resources and each record is carefully processed by its editorial team. The service was initiated as a collaborative project between Lund University and University of Nottingham, funded by Jisc, OSI, SPARC and CURL.

ROAR (Registry of Open Access Repositories)

Registry of Open Access Resources (ROAR) is an international registry that aims to promote development of open access repositories throughout the world to maximize research access making it more productive and effective.

ROARMAP (Registry of Open Access Repository Mandates and Policies)

The Registry of Open Access Repository Mandates and Policies (ROARMAP) is an international registry laying out the growth of open access mandates & policies followed by research institutions, funding agencies and universities to provide free and open access to peer reviewed research output.

Repository 66 Map

Repository 66 Map is a map that shows open access digital repositories worldwide by making use of data from OpenDOAR and ROAR.

SCOAP3 Repository

Sponsoring Consortium for Open Access Publishing in Particle Physics (SCOAP3) repository is a platform for distribution of information that is freely accessible. All the articles funded by and published under SCOAP3 are hosted in this repository that appears side by side on the publisher's own platforms also.

Electronic Journals

DOAJ (Directory of Open Access Journals)

It is an online directory that indexes and provides access to peer reviewed high quality open access journals from all disciplines in about 80 languages. All DOAJ services are freely available including indexing. It offers access to above 12,000 journals without APCs.

Bioline International

Bioline International is a non-profit scholarly publishing cooperative to provide access to quality open journals published in developing countries. It aims to bridge the knowledge divide by providing a platform for distributing peer reviewed journals from countries like India, Iran, Bangladesh, Colombia, Ghana, Kenya, Malaysia, Turkey, Uganda, etc. available to global research community. Reducing knowledge gap is essential in understanding of biodiversity, environment, health and international development.

BioMed Central

A part of Springer Nature, BioMed Central (BMC) is a pioneer in open access publishing and offers a wide portfolio of subject fields on a single open access platform. It has expanded beyond biomedicine to disciplines like mathematics, engineering and physical sciences.

PLOS Journals

PLOS is a non-profit open access publisher empowering progress in science and medicine through transformation in research communication by collaborating with countries to make science publications accessible to the whole community fairly and equitably.

PubMed Central

PubMed Central (PMC) is a free full text archive of biomedical and life sciences journals at the U.S. National Institutes of Health's National Library of Medicine NIH/NLM). It is developed and managed NLM's National centre for Biotechnology Information (NCBI). It serves as a digital counterpart to print journal collections of NLM as a mandate to collect and preserve biomedical literature. It currently contains over 6 million full-text records.

Open Access E-Print Archives

AgEcon Search

AgEcon Search: Research in Agricultural and Applied Economics is a non-profit subject repository that provides free access to full-text documents to viewers from about 170 countries. It collects, indexes, and distributes full text research electronically in broad fields of agricultural and applied economics. AgEcon Search serves as the permanent archive for this research literature providing reliable long term access and digital dissemination of scholarly works worldwide.

ArXiv.org

ArXiv is an open access archive and a free distribution service for scholarly articles in disciplines like quantitative biology, physics, chemistry, computer science, economics, engineering and more. The content available on aRxiv.org is not peer reviewed by arXiv. It offers a range of services to the researchers such as compilation, production, search, retrieval, web distribution and preservation.

CERN

CERN Document Server is an open access repository to access articles, reports, bulletins, project documents and multimedia content etc. Its site is available in multiple languages.

Open Archive HAL

Open archive HAL is devoted to archiving and dissemination of published or unpublished scientific literature from research institutions and universities from all disciplines of humanities and social sciences. It is a platform where authors from all academic fields can submit their scholarly work.

PhilSci Archive

PhilSci-Archive is an electronic archive designed specifically for and run by the philosophers of science. It is a free service that aims to promote communication and dissemination of new work by providing an open accessible stable repository of monographs and scholarly articles. It covers areas like general philosophy of science, feminist philosophy of science, history and philosophy of science, etc.

ViXra

ViXra.org is an e-print archive, an alternative to arXiv.org owned by Cornell University. It was founded by scientists who couldn't submit their work to arXiv.org because of endorsement and moderation policy of Cornell University to filter out e-prints considered inappropriate by them. ViXra.org is neither associated with Cornell nor arXiv.org.

Conclusion

Universal access to information is one of the fundamental conditions to achieve global knowledge societies. But there is a gap between industrialized nations and economically emerging ones; to reduce this gap, it is required to adopt open access policy for publications to increase visibility in research in order to bridge the knowledge divide. With Open Access, expensive prices and copyrights will no longer be obstacles to the dissemination of knowledge. Everyone is free to add information, modify contents, translate texts into other languages, and disseminate an entire electronic publication. There are many organizations which advocate OA through social media and provide guidance for others.

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Authors' Rights and Licenses in Open Access Environment: An Overview

Dr. Sharad Kumar Sonkar & Amit Kumar Verma

Abstract

This chapter examines the authors' rights and licenses in open access environment. Here we discussed the different kinds of open access licenses, usability and restrictions in scholarly papers and artistic work, and explained the authors' rights under distinguishing open access licenses. Gold Open Access and Green Open Access are two significant open access routes offered to researcher communities. The gold open access channel frequently serves open access journals and open access content in hybrid electronic journals. Institutional and disciplinary knowledge repositories are served through the green open access channel. While signing a copyright transfer agreement or a license to publish agreement, scholarly authors are also made aware of their author rights and some of the rights they can keep. There are two essential alternatives to the Copyright system for protecting the author's rights and users' capacity to use, reuse, share, distribute, and change the original work: Copyleft and Creative Commons licenses. These licenses are beneficial to research groups to ensure freedom of sharing, usage, reuse, and change.

Keywords: *Open Access (OA), Open Licenses, Creative Commons, Copyleft, Open Publication License, Open Content Licenses.*

Introduction

Open Access (OA) is a term that refers to unrestricted access to scholarly content. Its goal is to give people knowledge that is free of commercial benefit or commercial motives. The researchers' main issue is the poor access to journals

and the low reflectiveness of valued scholarly publishing. According to Peter Suber (2012), "Open access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions." Three declarations of open access have transformed the whole meaning of the scholarly communication environment. Scholars still prefer to acquire knowledge from the print versions of the journals, despite the emergence of e-journals many centuries ago. The concept of open access journals originated from electronic journals, where scholars can get free access to articles from the published journal. There was no adequate provision to deal with open access in copyright regime earlier. After the introduction of Creative Commons (CC) licenses in 2001, the America-based non-profit organization Creative Commons has made the arrangements of hassle-free copyright restriction of Open Access knowledge resources. Creative Commons (CC) licenses help researchers to publish their work in open access journals. Two significant open-access models are available for the scholarly community, i.e. Gold Open Access and Green Open Access. Apart from this, there are many other contemporary models have introduced by commercial publishers according to their relevance.

Gold route OA model provides the concept of publishing all articles and related content free immediately on the Journals website. In this case, articles are licensed via creative commons. Readers can download, share and reuse the same papers. Green route OA model is defined as shelf-archiving and provides the facility to the authors can archive their original or genuine work in their own or funders' website, subject and institutional repository from where readers can download the same without paying any charges. Green open positions like gratis for the authors. Very few publishers charge an additional service like an authored copyrightable portion of the printed version. The author submits the final article version after post peer review by the journals called 'post print'. This paper covers various author rights, distinguished licenses, and rights assessment tools strengthen to scholars' community and enhance awareness.(*UNESCO's Open Access (OA) Curriculum Is Now Online | United Nations Educational, Scientific and Cultural Organization*, n.d.)

Intellectual Property Rights (IPR)

Usually, creative and innovative minds of scholars churn out on the matter of technological changes, societal transformation and their comforts. In Scientific research, researchers are experiencing many real-life problems as well as assumed and notional problems. WIPO (2008) defines "Intellectual property, very broadly, means the legal rights which result from intellectual activity in the industrial, scientific, literary and artistic fields. Countries have laws to protect intellectual property for two main reasons. One is to give

statutory expression to the moral and economic rights of creators in their creations and the rights of the public in access to those creations. The second is to promote, as a deliberate act of Government policy, creativity and the dissemination and application of its results and to encourage fair trading which would contribute to economic and social development."(Romer, 2002)There are many kinds of Intellectual Property for defining the rights of creators, inventors and researchers. More prominent kinds are mentioned below-

1. Patent
2. Copyright
3. Trademarks
4. Industrial Design
5. Integrated Circuits (IC)
6. Geographical Indicators (GI)

WIPO (2008) defines 'Patent'- "a document, issued, upon application, by a government office (or a regional office acting for several countries), which describes an invention and creates a legal situation in which the patented invention can normally only be exploited (manufactured, used, sold, imported) with the authorization of the owner of the patent." The patent is a premier tool to protect scientific projects and discoveries.("World Intellectual Property Organization," 2021)

WIPO (2008) defines 'Copyright' as "a legal term used to describe the rights that creators have over their literary and artistic works. Works covered by copyright range from books, music, paintings, sculpture and films, to computer programs, databases, advertisements, maps and technical drawings." Copyright is a crucial tool for protecting the scientific and researchers groups as they publish their findings in scholarly journals, conferences, monographs, theses and other research literature. Copyright laws are country-specific and vary from country to country.(*The 45 Adopted Recommendations under the WIPO Development Agenda*, n.d.)

The authors who has created the content of knowledge creation and solely responsible for this creation. And the principal owner of the copyright. Sometimes, commercial publishers demand to transfer the copyright from the principal owner to the publisher to publish their research papers and create scholarly sources (like journals, monographs, conference proceedings, etc.). While transferring the copyright, the author transfers many rights to the publisher like reuse, translation, distribution, public performance, modification, and public display of the creator's original work. An author is the primary copyright holder of his work until or unless the author transfer his copyright to someone by a signed agreement.

Open Licenses

For protecting the author's rights and users' ability to use, reuse, share, distribute, and modify the original work, there are two critical alternatives to the Copyright system: Copyleft and Creative Commons licenses. These are the licenses are very helpful for research communities to assure the freedom of sharing, use, reuse and change. Some popular forms of open licenses are discussed below:

Copyleft

Copyleft in the form of licenses can be used to keep copyright terms for various works, including software, documents, art, scientific discoveries, and even patents. It is a kind of open-source software licensing. Copyleft is also a general way for designating a creative work as freely modifiable and requires that all changed and extended versions of the creative work be made available for free. Researchers and Creators intend to keep their work in the public domain for the motive of reuse, share for creative minds and inspire him from around the world. Copyleft is the concept of licensing. It is mostly used in the open-source world, but it is not limited to software also used for digital arts, writing, science and creative content. Copyleft plays a crucial role in more improvement in work and specialization. Copyleft software can be modified, used, distributed, and produced by source code kept open and available for the public; moreover, derivatives to be transferred similar copyleft license that came with the original work. Copyleft comes with certain freedom which are not a part of copyright –

- Freedom 0- Use the work
- Freedom 1- Study the work
- Freedom 2- Copy and Share the work
- Freedom 3- Modified and distribute derivatives and modification

The best example of copyleft is Linux based applications. The life of protecting the work of copyleft equals the lifetime of copyright. The laws of copyright themselves protect copyleft. However, it allows freedom to modify and distribute original copyright material.("Copyleft," 2021)to documents, art, scientific discoveries and even certain patents.Copyleft software licenses are considered protective or reciprocal in contrast with permissive free software licenses, and require that information necessary for reproducing and modifying the work must be made available to recipients of the software program, or binaries. This information is most commonly in the form of source code files, which usually contain a copy of the license terms and acknowledge the authors of the code.\nNotable copyleft licenses include the GNU General Public License (GPL

GNU-GPL (General Public License)

GNU- General Public License commonly used for free software licenses. It gives them the freedom to run, study and modify the software. Richard Stallman wrote this license of the Free Software Foundation (FSF) for the GNU project. The first version of the license was launched in 1989 as GPL version 1.0. GNU GPL gives freedom to use, study, share and modify computer software. ("GNU General Public License," 2021)study, share, and modify the software. The licenses were originally written by Richard Stallman, founder of the Free Software Foundation (FSF

Open Publication License (OPL)

The Open Publication License was introduced in 1999 as OPL version 1.0. The wiki books project has adopted OPL for online distribution. The Copyleft, GNU-GPL, and OPL are collaborative and community-based efforts to create shareable and editable computer software, technical literature, and creative work. These licences also attempt to reduce overdependence on multinational and huge enterprises that exploit community knowledge for profit.("Open Publication License," 2020)

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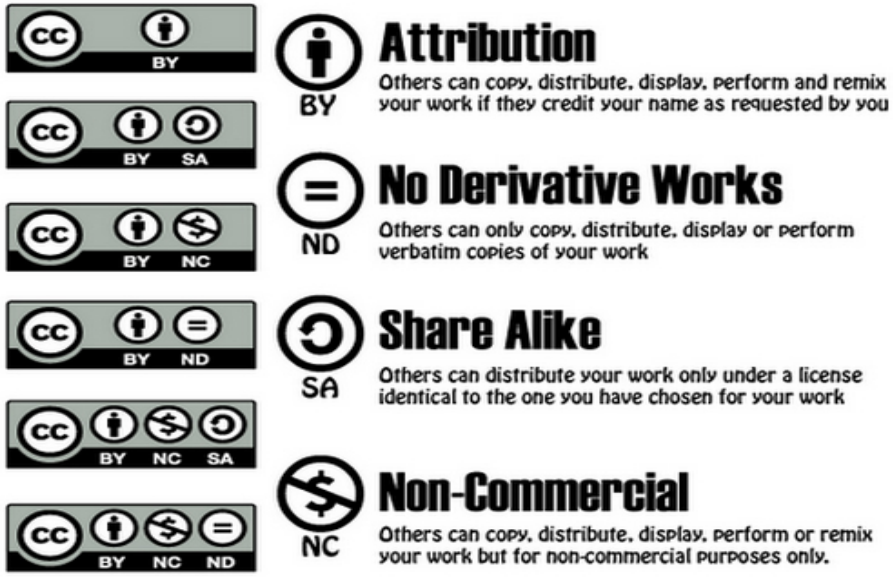
Creative Commons licences come in a variety of flavours. Each licence is distinct in various ways that affect the terms of distribution. First distributed on December 16, 2002, by Creative Commons, a non-profit U.S. organisation that was created in 2001. The suite of licences has also had five versions, numbered 1.0 through 4.0. The 4.0 license suite is the most recent. CC License is extensively used for scholarly communication and creative audio-visual communication and guaranty the notion of freedom to share, reuse and modify scholarly content or artistic work for knowledge re-creation or Ideal use. Creative Commons becomes the Science Commons in the scholarly communications environment, which assures free access to research material and data. As shown in figure 1, there are six types of creative commons license like CC BY, CC BY-SA, CC BY-NC, CC BY-ND, CC BY-NC-SA, and CC BY-ND. SA stands for share-alike, NC is used for Non-Comercial, and ND stands for No derivative works. The best generous term is CC BY. Here users can copy, distribute, publish, perform, and remix an author's work if they credit the author's name, as the author has desired. CC BY-NC-ND is the most restricted term, allowing users to reproduce, distribute, display, and perform verbatim copies of an author's work for non-commercial reasons only.("Creative Commons," 2021)

CC LICENSES	TERMINOLOGY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Others can only copy, distribute, display or perform verbatim copies of your work
Share Alike
Others can distribute your work only under a license identical to the one you have chosen for your work
Non-Commercial
Others can copy, distribute, display, perform or remix your work but for non-commercial purposes only.

Figure 1: https://www.fullerton.edu/openfullerton/of_learn/creative_commons.php

Conclusion

Intellectual property rights are protected during the creation, publication, and distribution of knowledge. The electronic publishing environment facilitates the dissemination of one's scholarly papers to a global audience. However, transferring the copyright of academic work to its publishers may limit an author's ability to disseminate their work over a global network. On the other hand, authors may be granted some exceptions in utilising, reusing or distributing their works. Self-archiving in institutional or discipline repositories can freely make research articles published in toll-access journals or conference proceedings. Authors can share, use, adapt, distribute, and modify their work under the terms of Creative Commons (CC) licences. When an author shares his or her "recently published" research article on social media, in a personalised researcher's profile, or online forums, it has a significantly higher chance of being viewed or spotted by co-researchers working in similar or related fields. All six types of CC licences grant sharing and fair-use rights.

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10

MOOCs (Massive Open Online Courses): A Look to the Future of Learning

Vrij Kishor Mishra

Abstract

Massive Open-Online Courses (MOOCs) is very usefull for online user. MOOCs provide different way to how learn for new skills and develop your career and in different educational platform and research experiences in all field. Millions of people around the Universe use MOOCs to learn for quality of education and research work. all the work of Teaching, e-learning and multitasking quality and much more. MOOCs have many changed in the way of teaching and learning. learning courses in distance-education are running worldwide successfully.

In the modern age, it's had good opportunity to examin yourself in the field of knowledge and see what you do in your advance study. All the materials of this topics are available and uploaded on this platform very esaily. we are access this whenever and wherever in the world.

Keywords: *Quasi- and cMOOC, Research & Development, eXtendedMOOC, MOOCs e-learning.*

Introduction

In Modern era, the new education policy on MOOCs that allows to study online courses from different ways everywhere around the world. the process of MOOCs are PreProduction, Production, Post Production Maintenance all this process is very usefull for e-learning users who is related of this platform.

Primary study of MOOCs is very important for our youth of our nation and enhance its caliber and skill, in the cause of lack of resources. The Education Ministry has taken the lead role in skill, teaching and learning development

programme in nation. which is govern by latest version of MOOCs. SWAYAM which stands for study with help of W3(www) for active learning by young users. Consortium for Educational Communication (CEC), New Delhi is one of the core central institutes that are identified by education ministry for research and development of MOOCs in world.

In the Context of modern world, MOOCs is very usefull and very relevant of them, because they provide technique to how reach large number of learners at any cost at any place in their study and research development.the process MOOCs is very flexible and for all institutions in the all over world.

Purpose

MOOCs is improving the quality of study and teaching and educational techniques, increase the interest user in the field of higher education with quality access of users across the nation.

MOOCs Objectives

1. Enhance the skill of the learns.
2. Developed the subject approach of user in relevant field(subject) etc.
3. Give the right way in the right time at right place for the right person.

Role of Consortium for Educational Communication in MOOCs

MOOCs established by the UGC in 1993, under section 12(CCC) of its act No.3 of 1956. It is a Nodal agency at national level and address the user educational needs for communication. MOOCs format is represented of the entire e- Content of R & D as the part of CEC project under NMEICT, MHRD. digital e- content of MOOCs is very usefull for the teachers and institutions in all over world. MOOCs format is Creating and formulating of faculty and subjects' experts in the field of study, teaching and learning for Education cell and media centres.

Benefits of MOOCs

1. Creating of e-content of subject and Publish for a large number of students.
2. Its contents are developed by CEC for relevant user.
3. Enhance of study and teaching of student and teachers' knowledge in the field of
4. R & D.
5. MOOCs is very helpfull for Students and Teachers.

6. It's Increased collaboration for cloud accessibilty across the nation.
7. Classification of MOOCs is for purpose of learning and R &D.
8. It is more useful for legal approaches.
9. MOOCs is associated with a socially-constructive pedagogical approach for teaching and learning.
10. It is useful blogs, wikis and social media for searching information by like eXtensible, Quasi-MOOC, LMOOC, hybrid MOOC or MOOC 3.0. This concept supports hybrid, integrated and combine online and face-to-face teaching/learning.

Conclusion

In the present time MOOCs programmes are one of the most innovative initiatives of in the field of education for e-learning and distance education. It creates new learning opportunities in the field of open education. However, this is not consolidated approaches for regarding the logistics of MOOCs design and development of its content. Designing the MOOCs training programme, and to take necessary step in account of all the wishes and opportunities of the learner's and audience. In the future it is planned to develop statistical tools for this MOOCs, as well as to study personalization issues that will take into account the desires and opportunities of students.

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11

Role of Libraries in Preventing Academic Integrity and Plagiarism

Geeta & Meemansha Nabiyal

Abstract

This paper aims to provide an overview of the importance of academic integrity and plagiarism among everyone, especially students. Information is the crucial ingredient in the process of effective scholarly productivity. And the explosion of information on the web changes theinformation dissemination game to prevent these situations organizations like libraries ought to take responsibility to educate their user community about citation, academic dishonesty, plagiarism and its penalties, open access, bibliographies, and others.

Introduction

Plagiarism is referred to academic dishonesty, when the work or ideas of an author are expressed by someone in their own way and credit is not given to that author, then it comes under plagiarism. On the other hand Academic integrity is based on high ethical values. It refers to a situation in which students in a higher educational institution do their work honestly. It promotes independent learning and works of critical thinking. To maintain the integrity of the Academy, academicians should do their work honestly and avoid works of plagiarism. Higher educational institutions should promote academic integrity as it actually develops students academically and tells them how to face the challenges they face in their studies. The integrity of the academy reflects the value of the educational institution. (**Ivy Panda, 2020)**

What is Academic Integrity? (TEQSA, 2017)

Academic integrity refers to doing the right thing on a right way. Remembering the fundamental values, trust respect responsibility courage and honesty even in the phase of adversity, are the hallmarks of academic integrity. Academic integrity plays an important role in higher education. Academic integrity refers to completing any work in an ethical, honest and responsible manner. Teacher, researcher, student or others who do their work must be completed with academic integrity. According to Singapore Statement on Research Integrity, 2010 Research integrity is defined in terms of the reliability of research findings.

History of Academic Integrity

During the late 18th century, academic integrity was tightly correlated to the honor code (United States). The integrity of the Academy was mainly judged by the work of the students of the time and the surrounding culture. The honor code mainly focused on power, pride, duty, and self- esteem.

As new discoveries and inventions took places, new theories started coming in and as the goals of the university changed, so did the concept of academic integrity also changed. **(Wikipedia, 2021)**

Why Academic Integrity is Important?

There are so many reasons why academic integrity is important. Academic integrity means you can be trusted. The people who work with you know that you will do your job right, so they trust that you will do what you say in the right way. Additionally, trust is one of the key characteristics. Such persons have a different reputation in the society who knows how to do their work properly. To be successful in any business, working honestly is extremely important. Our world is based on our ability. It is very important to trust each other. This is possible only when the work is done with honesty and fairness. Good habits are the product of a bright future. Working in the right format enhances your moral value as well as your own value which is an important aspect of academic integrity. Second, having academic integrity is important because it adds to the importance of your degree. Employers prefer to hire graduates whose degreesdemonstrate academic integrity. Such graduates are given first preference. Finally, having academic integrity is important because it gives you the satisfaction that you have done your job properly which is important. The result of the work done in the right way is always successful. **(Houston Texas Bauer College of Business, 2019)**

Background of Plagiarism

In the early 17 century, the term plagiarism is originated from the Latin word "plagiarius" which signifies as "kidnapper" to indicate stealing someone else's intellectual output. **(Meera & Singh, 2017)**

According to the Merriam-Webster online dictionary (2021), "plagiarism" means:

1. the act of using another person's words or ideas without giving credit to that person
2. the act of plagiarizing something.

In other words, plagiarism is considered as a deed of fraud, it involves presenting someone else's original ideas or words as your creative output without giving credit to the original creator.

Why do Academicians Plagiarize? (Turnitin, 2017)

The rise of the internet is one main reason behind the growth rate of plagiarized content hence one can readily borrow and copy others' first-hand thoughts or ideas.

Sometimes students, faculty, and researchers are unintentionally copying due to a lack of awareness about plagiarism issues.

Need of proper guidance in creating a substantial original idea, which teachers should teach the students in their primary schooling so that students won't face a problem in higher level.

A language barrier can be one of the major causes which lead academicians to plagiarism, for instance, some students find difficulty in expressing their thoughts even though they have fascinating ideas.

- Poor time management.
- Lack of creativity etc.

Role of libraries in fostering academic integrity (Gaur, 2019)

1. Libraries are undoubtedly performing an integral part in promoting equality, education, literacy, information, ethics, moral values, and most importantly in the R&D field of any institution.
2. Plan workshops on plagiarism policy, open access policy, and proper guidelines will help users in understanding the concept of academic integrity in a better way.
3. Libraries require designing a credit course for students which should be mandatorilyincorporated in their curriculum.
4. Libraries promote the bookmarks related to academic integrity i.e. plagiarism, intellectualproperty, open access, reference tools, etc.

5. Libraries need to post the message of academic integrity on libraries' social mediahandles as most users are active on social media platforms.
6. Educate scholars' regarding how to detect and prevent plagiarism in producing qualityintellectual work.
7. Libraries should prepare a reference style guide for the ready reference purpose,referencing plays a vital part in preventing plagiarism.

Hence, scholarly productivity is essential for the growing world, and the appropriate way to promote and support intellectual work is entirely attainable if scholars are thoroughly knowledgeable on the topic of academic integrity and plagiarism, and proper citation.

Checkpoints for avoiding plagiarism (Roka, 2017)

1. Ethical scholars always acknowledge the original creator.
2. Enclose within quotation marks, all the text that has been copied verbatim from anothersource.
3. While paraphrasing, entirely comprehends and communicates in your own words.
4. Use of proper citation styles such as APA, MLA, Chicago, etc.
5. The use of Reference management tools would benefit the researcher, such as Endnote,Zotero, Mendeley, Paperpile, etc.
6. Plagiarism detection software benefits in the detection of plagiarism, such as Ephorus, WCopyFind, SafeAssign, iThenticate, Turnitin and Urkund, etc.

Conclusion

Academic integrity exhibits the academic's commitment towards reliable and ethical practice in the research field. Academic integrity is crucial at the academic level as it deals with giving acknowledgment to other scholarly works and ideas. Plagiarism lowers academic integrity and also creates confusion among students. As Information technology continues to expand; it becomes an interruption to academic integrity. It is important to know students that what is plagiarism and its impact on academic integrity so that they are kept away from plagiarism as much as possible. This is possible only when they know the importance of academic integrity and the ill-effects ofplagiarism.

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12

Digital Right Management and the Academic Libraries: A Study

Mr. Gaurav Singh Chauhan & Dr. Manoj Kumar Tiwari

Abstract

Digital rights ascendancy systems aim to actualize a comfortable framework to ascendancy get acceptance to and the accomplishments that customers, anniversary human and system, can take. DRM technologies accept turn out to be a actual critical position central the developing association world due to their constant ascendancy over the file. This is advantageous not best effective to action privateness, but additionally to bouncer personal files. Agenda rights ascendancy systems, at the ancillary of abstruse safeguards, accept emerge as an arguable topic for altercation of copyrighted works, distinctively after the Sony BMG case. Therefore, this book provides an apple-pie angle pointing to hints and challenges for librarians and educators in growing countries on a way to accord with the ambitious situations of agenda rights ascendancy with commendations to accouterment users and academy students with complete access to the statistics.

Keywords: *Digital Right, Digital Right Management*

Introduction

Digital Rights Administration (DRM) can be apparent as an attack to accommodate "remote control" of agenda content. The akin of aegis required goes above the simple commitment of agenda content, restrictions on the use of agreeable must abide in aftereffect after delivery. In added words, DRM requires "permanent protection" - that is, aegis that stays with the content. Intellectual acreage is about protected by a agenda rights administration system by transforming the abstracts so that agreeable with an agenda watermark is alone available to accustomed users or cannot be advisedly

redistributed. The technology aims to aggrandize the types and / or bulk of ascendancy that absorb holders can access over their bookish property. Restrictions on agenda rights administration are now backed by the aphorism of law. In essence, absorb holders now accept the adeptness to address their own intellectual acreage regime in computer code, dupe that the DMCA will accompany the administration back to the force of law. Not surprisingly, in ablaze of these developments, many accept raised apropos that absorb owners may use agenda rights administration technologies to attenuate opportunities ahead allowed to the accessible under absorb law. columnist according to the article of "fair use". For example, accede an e-book. Such a book can be beatific over the Internet application standard cryptographic methods. But if the almsman can accumulate the book unlimitedly, he is chargeless to administer the perfect agenda copy to a ample percentage of the world's population. This abhorrence has affected publishers to abundantly abandon the potentially advantageous sale of agenda books and has had a agnate deterrent aftereffect on the acknowledged distribution of added types of agenda content. Without able-bodied DRM, agenda content owners accept no best but to await on the account system. There is a complete and reliable crypto approach that can be activated to the botheration of secure commitment of agenda content. Unfortunately, there is currently no comparable approach for the DRM problem. An able DRM adjustment will accept far-reaching implications. For example, armed with able DRM, a being can maintain ascendancy over personal abstracts on the Internet. In fact, it has been appropriate that online aloofness can alone survive if DRM is successful. However, the accepted consensus is that such a high akin of aegis is unattainable with DRM, at atomic in today's PC-dominated world. Additionally, contempo research supports a bleak view of software obfuscation, accustomed as an able DRM-enabling technology.

What is DRM?

Digital Rights Administration is an appellation commonly abbreviated as DRM. Agenda rights administration is the aggregate name for a technology or set of techniques that prevents a copyrighted agenda work from actuality used above the ambit of the absorb owner (or a administrator other than the absorb owner) wants to acquiesce its use. ... This is absolutely a alternation of techniques that use advice about rights and absorb holders to administer copyrighted actual and the agreement under which it is fabricated available to users. In added formal terms, DRM is declared as "a way of apropos to the description, identification, trading, protection, ecology and tracking of all forms of use of rights to actual and abstract assets, including the administration of the accord of the holders. of rights". There are two accessible interpretations of the appellation digital rights management:

Digital Rights Management

Responsibility for the announcement and administration of the rights of the agreeable in cyber banking or agenda form as a aftereffect of the printed content. Digital rights management: The adeptness to physically administer intellectual acreage and agreeable proprietary rights through a cyber banking system or action associated with copyright administration systems. "Digital" does not accredit to the rights to information, but to the agency by which that advice is expressed. The rights it manages are not digital. This is the agreeable of the assignment in agenda form. Agenda rights administration systems can be acclimated to assure valuable agenda assets and ascendancy their administration and use. The DRM arrangement offers continuous agreeable protection adjoin unauthorized admission to digital agreeable by restricting admission only to those with able authorization. It charges be adjustable to administer the rights to use altered types of digital agreeable on altered platforms and ascendancy access to agreeable delivered on concrete media or any added method of distribution.

Concept of Digital Right Management and its Need

The appellation Digital Rights Administration is additionally sometimes alleged copy ascendancy and archetype protection. This is declared as technological ascendancy over admission to agenda content. This is acclimated by developers of appear software to anticipate unauthorized use of their agenda materials. Intellectual acreage law as a savior for the administration of recognized agenda rights. This ensures a safe agenda power system. Electronic Archetype Rights Administration Systems (ECMS) are additionally called agenda rights management. When it comes to information, this technology is alive well. Those absorb holders who accept adequate assets for the abstracts spread by this agenda rights administration system. It assumes that the use of the chat "Correct" in the charge less software abject is ambiguous and suggests application DRM instead of DRM. attempt the actuality of absorb problems. These days abstruse inventions are arising to assure intellectual property. Libraries acclimated to buy a archetype of a book for their assemblage and it was acclimated until it was larboard in the library. But agenda information is licensed, and alone those with permission from the administrator can admission digital advice in any way. So it was a abundant test for the content. People are not acquainted of the analytical issue of agenda rights and librarians can brainwash them about it. Three capital reasons for implementing agenda rights administration were considered:

1. Publishers accept no direct ascendancy if food are fabricated through third parties.

2. Abhorrence that this could advance to misuse.
3. They abhorrence the abrasion of their underwriting base.
4. Today, in a absolutely developed agenda rights administration system, it is a proprietary account for which the buyer and the user charge to acquirement a assertive technology or device.

Characteristics of Digital Right Management

There are assertive characteristics of agenda rights management. The absorb holder can ascendancy access and use:

1. The absorb holder can change the admission rights afterwards distribution.
2. Provides reliable security.
3. The basic machine is at accident of attack.
4. The buyer of the rights allows the ecology of use and access.
5. It can be a admittance to reclaim a agenda container.
6. DRM allowed admission to adequate offline data
7. The architectonics allows the alteration of rights after third parties.

Digital Right Management and Libraries

In the avant-garde era, libraries comedy a axiological role in the development of a autonomous society, accouterment all associates of the association with admission to a advanced range of knowledge, ideas, opinions, as able-bodied as cultural, accurate and educational information. In developing countries such as India, libraries are accepting low-cost admission to a all-inclusive array of all-embracing academic journals and databases. Libraries and the allowance house provide admission to agenda materials through a array of acknowledged constructs; authorization agreement, civic copyright law requirements, acknowledged deposit and accessible domain. Agenda rights administration is dangerous. Now Actual delivered and paid for by the library has become bare due to abstruse disclosure measures, while suppliers accept since closed, or it is not assisting for the supplier to fix the problem, and the bulk of money is too baby for the library. As a result, the actual is finer removed from the library collection. Libraries accept less rights in the agenda environment than in the book world. Instead, libraries are appropriate to accomplish special agreements with individual absorb holders to access content that is chargeless from agenda rights administration or abstention under bound circumstances. There is no agnosticism that DRM has no averseness in claiming that agenda rights administration software, which has a abundant impact on libraries, is currently in its adolescence and that it takes a difficult time to advance the software. It is because of the long-term

papules of agenda rights administration that cannot be predicted today as the technology is in its infancy. There are some accepted caveats to accumulate in apperception so that library loans are not affected. There is currently a charge to catechumen the cachet of bookish works into accommodation schemes, as this is identical to a concise sale transaction.

Digital Right Management and Digital Libraries

The evolving online advice management is a ample problem that emerges in a advanced variety of applications. In because the affidavit for implementing admission policies, he acclaimed that agenda library administrators generally need to restrict admission to portions of their collections for a array of reasons, including donor restrictions, atrocious confidentiality, licenses, agreements, and added copyright agreements. Added absorb owners and publishers' appetite to control admission to cyber banking resources. Because they charge to be paid to use their content, but added issues authority back the admeasurements of crooked plagiarism behavior developed by managers, agenda library administrators' comedy an important role in any agenda rights administration system. Creators, agreeable and consumers are the leash of any agenda library administration system. Any action formulated by managers, managers, should not already affect their polling functions, acquaintance and abandon of expression. This is based on the accessible technologies that we are implementing in the agenda rights administration system.

Talking points from Digital Right Management

Libraries argue digital rights managers blocking readers from accessing assertive eBook formats. Libraries and readers accurately purchasing agreeable should be able to apprehend that agreeable on any device. Libraries argue digital rights management, which is acclimated to clue the behavior of specific readers, what they read, back they charge it, and area they adopt to apprehend it. Libraries and readers are in charge of new technology that protects and expands admission to e-books and other agenda content. Libraries and readers charge consistent standards and formats that enable, rather than restrict, account across all technology accessories and platforms.

Impacts of Digital Right Management on Libraries

There is no agnosticism that agenda rights administration can accept a huge papule on libraries and the way they do their work. Better agenda rights administration systems could acquiesce libraries to accommodate additional casework beyond loans, such as the affiliation of agenda library abstracts into educational abstracts in educational institutions. But agenda rights administration can additionally pose big challenges, abnormally in areas like.

Digital Right Management in Current Scenario

In the accepted scenario after DRM, the all-embracing architecture supports interoperability and reuses assertive DRM software technologies. The abridgement of architectonics is a above obstacle in ablaze of a rapidly evolving circuitous area such as agenda rights management. A single agenda rights administration technology or accepted is absurd to be accordant with assorted devices. In a advanced variety of basal systems accompanying to the security, adaptability and ability of user platforms and media.

The Future of Digital Rights Management

The European Agency supports the development of interoperable abstruse systems for absorb protection, such as agenda rights administration systems. According to the commission, agenda rights administration consists of technologies that analyze and describe agenda content adequate by bookish property rights. They can additionally facilitate acknowledged copying and reclaim of agreeable by creating a defended environment in which absorb holders are paid to archetype privately, online agreeable is paid for, and illegal artful is prevented. However, the agency is a high-level accumulation on agenda rights administration systems that submitted its final address on July 8, 2004, absorption a accord on the capital principles and recommendations for approaching action in these areas: rights to be promoted. Transition to accepted services. The corruption and crooked file administration of copyrighted agreeable should not be tolerated, and consumers should be encouraged to use accepted services.

Conclusion

The absolute motive abaft digital rights administration technology is to access profits for those who use it. Its account is a accessory issue back our abandon to apprehend and apprentice is at stake. While it is profit-driven, it is not amiss in itself, which cannot absolve denying accessible control over its technology and its libraries. Protecting abandon means giving up agenda rights management. The appeal for agenda rights administration will abide to abound as agreeable providers and organizations apprehend the amount and charge to assure their bookish property or added security and claimed information. However, some laws and regulations are binding and enforceable, and the protections of agenda rights administration systems are still in place. Agenda rights administration can abnormally impact fair use practices, users' abandon of expression, and privacy. As Timothy accurately put it in 2006, "recognizing and all-around the rights of parties on both abandon of the fair use equation, such as implementation, may able-bodied be the aboriginal truly aces of the name 'digital rights administration system.

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13

Collection Development in Changing Environment

Neelu Meena & Komal Kirad

Abstract

Collection Development is a very important concept for library. This study discusses the collection development in changing environment its shows that how to change traditional to digital and their impact, issues and challenges. Collection development polices is a blueprint for collection development. Usually, policies are developed by libraries with two people in mind first is library staff, the wide community of patron and users.

Keywords: *Collection Development, Digital Collection, E-Resources, Policy, Users.*

Introduction

At present time digital and electronic information material has become an important and necessary reading material for all of us. Today, we understand that the need of digital documents is more important than printed document and it would be more appropriate to say that we are using them more. The digital information is used to easy to access, also user friendly and many more things to do.

In view of the rapid growth of information in today's information explosion also the increase in the number of readers knowing it at the same speed, in view of doing various things like saving printing time, creating paperless society etc. publication of information resources has been started in digital modes, which are known as e-books, e-journals, e-thesis, e-reference books, e-newspapers, databases and so on. Some publications are being published by

the publishers in both digital and print mode, but some are being published in digital mode only. Information resources are available in two types in digital mode: online and offline.

In such a situation, keeping in mind the need of readers and the change in information resources due with respect of time, there are need-to-know new methods of collection development for libraries, information centers, information repositories, etc.

Review of Literature

(Okogwu & Ozioko, 2018) Conducted a study to find out the development of electronic information resources in university libraries in Southeast Nigeria. These libraries require time and finance to create electronic collections. Despite budget constraints, these libraries are gradually developing electronic collections realizing the need for electronic resources.

(Rath & Rath, 2014) explained the collection development principles and policies and a brief description of the importance of library collection development, challenges and solutions to the problems faced in collection management.

(Kempf, 2013) studied collection development in the digital age, calling digital forward libraries as hybrid libraries because these current libraries are redefining their collections by new digital collections with their own printed resources. Most of the resources are being incorporated into digital archives whose open access is available on the Internet. Co-operative organizations have grown rapidly so that access to digital information resources is not expensive for libraries.

(Newsom, 2012) described collection development as a process designed by librarians taking into account the organization's mission and users need, including resource acquisition and purchase recommendations.

(Casserly, 2002) found this practice helpful in his study developing a hybrid (both print and electronic) collection from an analog (print based) collection. Practice refers to how to implement the principles of library staff document selection, how to develop an archiving policy, how to evaluate hybrid information resources, etc. It will be easier for library staff to develop electronic collections through exercises.

Collection Development

Collection development is an important priority task for a librarian. All the functions and services of a library are linked to the collection of that library. It is not a stand-alone function, it is a collective work of several functions such as selection de-selection, acquisition, appraisal of resources, creation of library

collections, assignment of duties etc. to which library staff, publishers, vendors and users contribute**.**

According to Online Dictionary for Library and Information Science (ODLIS), "the process of planning and building a useful and balanced collection of library materials over a period of years, based on an ongoing assessment of the information need of the library clientele, analysis of usage statistics, and development includes the formulation of selection criteria, planning for resource sharing and replacement of lost and damaged items, as well as routine selection and de-selection decision. Large libraries and library systems may use an approval plan or blanket order plan to develop their collection. In small and medium sized libraries, collection development responsibilities are normally shared by all the librarians, based on their interest and subject specialization, usually under the overall guidance of a written collection development policy." (Reitz)

Collection Development Policy (CDP)

In the past, the library used to store only books, but keeping in mind the changes over time, access to the collection is being provided using new technologies, so changes are being made in the collection management policies continuously. That determines the criteria of collection development policy which shows user demand, budget, censorship, etc. They are to be used in selecting and de-selecting resources for a library collection. Each library has a different collection development policy, mainly because of the library staff and library users, as they differ in each library.

Digital Collection

All those resources which can be accessed through internet and use by handheld devices are called electronic resources or digital resources like, e-books, e-newspapers, e-reference books, e-zine, e-thesis, databases and many more.

Impact of Digital Collection

1. Quickly fulfill of user requirements hence saves the user's time.
2. No physical boundary hence saves library's building.
3. Easy access to the collection.
4. Nearly unlimited storage space at much lower cost.
5. Round the clock availability multiple access.
6. Copyright issues.

7. Lack of screening.
8. Job loss for traditional libraries and publishers.
9. Costs are spread and many become hidden.

Issues in Digital Collection

1. Digital divide: Digital divide is the difference between people in society who is interested and less interested to use digital devices like internet, computers, smartphones. The digital divide is a significant problem in developing countries. It is more in rural areas, there are many political, economic reasons and social aspects of its existence. Due to the digital divide, libraries are not able to provide digital services and resources with respect to their users. (Sumanjeet, 2010)
2. Number of computers: Even today, there are many libraries where the number of computers is less than the number of users.
3. Authenticity: Digital content abounds in today time but the problem is which one of them is reliable.
4. New technology: The data that which we are stored in present software we don't know k how long it will be accessible from them because the technology changing day by day does not support the old software and hardware. Therefore, using newly updated versions of software in the library and using new hardware technology becomes a problem for the librarian, as these are expensive.

Challenges of Digital Collection

1. Digital preservation policy: Digital preservation is a challenging task for libraries and archival centers. Looking at present digital age, all of them wants to digitize their content and give access to all those needy, that's why some are also working on it but the librarian is facing many problems in it, like copyright, budget and etc.
2. Copyright: Copyrighted material can be used by any person or entity only in accordance with the Copyright Act, so copyrighted material cannot be digitized without authorization.
3. Finance: It is an important point for the librarian to decide what the budget of his library is, so that keeping this in mind, he can select the resources according to the demand of the user or give the users access to them.
4. ICT skilled staff: there are some libraries in which despite having computer and internet facilities but the library staff do not know how to use them properly.

Managing the collection of information resources of both types (print and digital) in the library.

Conclusion and Suggestions

Collection development is a continuous cycle that will continue as long as the library is in active mode. In such a situation librarians have to face various problems and challenges in developing the collection, but collection development is an important task which is essential for the library. Keeping in mind the demand of the users, librarians always update their libraries with the latest technology. Training programs will have to be organized for the library staff and users, only then the librarians will be able to make their library services available properly in the changing environment.

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14

Knowledge Management (KM) Response to Major Challenges of Libraries

Seema Yadav & Dr. Meera

Abstract

The application of the concept of knowledge management (KM) in libraries has become a trend among both academicians and practitioners during past few years. There are various research works explaining the different aspects of the relationship between KM and libraries. The present paper investigated few of those works and it attempts to analyze how KM approach is helpful for libraries to deal with their several challenges today. Few major challenges identified and discussed in the study include: a) Survival (b) Quality library collection and services (c) Optimum utilization of library sources and services (d) Financial support (e) Competent library staff, and (f) Strong IT infrastructure. KM solutions to these challenges are based on the utilization of both explicit and implicit knowledge resources of library to create new knowledge in terms of innovative ideas, strategies, planning, etc., to sharpen the skills and competencies of LIS professionals, to consider the rapid technological advancement as an opportunity and not a threat, etc. The study includes various examples of what libraries have been doing to deal with the challenges and how KM approach could be considered as proper explanation as well as justifications for those actions. The study concludes that KM emphasizes the creative and strategic use of tacit knowledge to overcome the challenges of library and achieve the set goals and objectives in more efficient manner.

***Keywords**: Library Challenges, KM applications in libraries, Knowledge Management and Libraries, LIS professionals, Concept of KM in LIS field.*

Introduction

Knowledge Management (KM) can be defined as the systematic management of all kinds of knowledge (explicit, implicit or tacit) of an

organization starting from the identification of knowledge resources to their utilization for achieving the set goals and objectives in more effective and efficient manner. (Chaubey, 2015; Muzzammil & Asad, 2016; Skyrme, 2002;). It is called optimum utilization of existing knowledge of an organization to create new knowledge in the form of different strategies, rules and regulations, various processes or operations etc. to deal with several unavoidable challenges and to grow further.

Ganesh D. Bhatt (2001, p. 68) describes KM "as knowledge creation, knowledge validation, knowledge presentation, knowledge distribution, and knowledge application activities."

Gunjal Bhojaraju (2005, p.37) defined KM as "the process of gathering, managing and sharing employees' knowledge capital throughout the organization".

According to IFLA, KM "is a process of creating, storing, sharing, applying and re- using organisational knowledge to enable an organisation to achieve its goals and objectives." (2019)

The term 'knowledge management' emerged and developed in the field of management within the context of business organizations (Fernanda & Salwa, 2015; Ali et al., 2015; Patil, 2013). Though, it is an age-old concept which was initially limited to the abstract theories of different disciplines such as philosophy, religion, psychology etc. (Wiig, 2000). Gradually, it started evolving into a concrete idea since the industrialization period when a great amount of manual labour was replaced by systematic and mechanized system of working environment. Several companies began to be established with various machines and skilled workers which increased the speed as well as amount of production in less time (Radgah et al., 2015). One prominent example is the emergence of printing press in 1492 which led to the speedy and abundant publication of documents (Serenko, 2013). In this way, the technological advancement freed people from routine and tiresome activities and provided them with ample time and opportunity to focus on developing strategies to improve their quality of work along with quantity and thus, to acquire more profits, gain competitive advantage and expand their geographical limit from local to regional, national and global market. This is one example of knowledge management in which knowledge has been utilized to create ways to ease people's burden of engaging themselves into full time manual work only and help the business organizations to set universal standards to evaluate quality of work.

With the emergence of computer system or internet in the 20th century, a new phase of 'information explosion' took over and the focus of knowledge management shifted to the physical product management to information management in order to make abundant and complex information easily searchable and accessible. And technology played a very important role in

information management which helped big companies to manage their huge amount of data and information generated on daily basis. Today, we are living in knowledge-based era in which the focus of KM is no longer limited to data/ information management, rather, it has been further expanded to include the management of tacit knowledge also along with the explicit knowledge. Today is the age of knowledge economy and so 'knowledge' is considered as the main resource for any organization (Asogwa, 2012) and therefore, the concept of KM has become a central or controlling element of socio-economical, cultural and political development of a country. Prusak (2001) explained the development of the concept of KM as the result of the response of practitioners to various changing economic and social trends and he further classified the three of them as: (a) Globalization, (b) Ubiquitous Computing, and (c) knowledge-centric view of the firm. (p.1002)

Another interesting and innovative characteristic of KM concept identified during recent years is its application in non-profit organizations such as libraries and information centers (Husain & Nazim, 2013). Libraries are facing several challenges today and how KM concept can be seen as an opportunity for such service institutions, is the most widely explored area in both academic and practice field during past few decades. There are different studies based on different aspects related to KM applications in libraries, for example, its feasibility, importance, benefits, challenges or barriers and ways of its applications etc. The present study focuses on KM response to major challenges of libraries in order to analyze and explore the role of KM to overcome some of the major challenges faced by library and information centers today.

Challenge 1: Survival

Survival is the foremost challenge before libraries in today's highly advanced world in which there are other information systems also that have been emerged with the aim of fulfilling different information needs of people. For instance, internet is full of various databases, search engines, websites etc., which provide almost all information related to everything we want in a very effective and efficient manner. So, the need of libraries is in question today and also a big debatable topic. Therefore, libraries have to prove their relevance by being equally efficient and progressive. Knowledge Management (KM) is considered a "sustainable strategy" for organizations for their survival and competitive advantage (Ugwu & Ezema, 2010). The concept of KM is an opportunity for libraries which guides them to a new direction of finding solutions based on their own knowledge resources or assets existing in the form of their collection, services, technologies, housekeeping operations, human resources etc. and this is known as "systematic, deliberate leveraging of knowledge assets" (Chaubey, 2015).

KM promotes innovation which motivates an organisation to come up with more creative solutions to their problems and challenges (Edosio, 2014; Skyrme, 2002). For instance, the digital or virtual presence of library is a creative solution to the limited space problem of traditional library system and now more information sources could be stored and users can access them remotely. Use of modern technologies, for example, web 2.0 tools (wikis, blogs, podcasts, social networking sites etc.) has become a trend today which are used for different purposes such as, to reach out to maximum users, promotion of library sources and services, spreading awareness about library, display of latest arrivals etc., and therefore, it could be considered as a good example of innovation. So, the libraries are facing the survival challenge by seeking out the use of latest technologies to their benefits and adopting them for different library operations and services (Chaubey, 2015; Jain, 2013).

Challenge 2: Quality Library Collection and Services

Maintaining quality library collections and services is the core function of a library and has become a challenge in today's chaotic information environment. Because though we have access to each and every information today but getting the most suitable, relevant or authentic information in desirable format require more specific retrieval skills and knowledge.

KM emphasizes on developing well qualified, trained, skilled and competent human power and this can be applied in the context of libraries also so that LIS professionals come out of their stereotypical role of spending their maximum time and efforts in managing housekeeping operations only. They have to think outside the box and increase their interaction with users, improve their observation skills, evaluation skills and work on their creative intellect etc. in order to assess what users want exactly, need and require and how they can select quality information sources and make them accessible to the users in convenient manner. The application of KM concept in maintaining quality sources and services demands proper assessment of user interests or needs and proper selection of sources as per their requirements. Many libraries have been working towards providing customized services to users, for instance, repackaging of information products is a particular service of special libraries which includes the presentation of large and detailed information in consolidated manner based on the analytical and evaluative skills of LIS professionals. This saves the time and effort of users from going through a lot of sources. Institutional repository provides access to the research outputs of the institution itself which has become a useful source of information for users (research scholars in particular). Thus, maintaining institutional repositories means maintaining knowledge representations of an institution.

So, maintaining quality library collection and services in a library require different kinds of skills (observation, analytical and evaluative skills). In the context of KM concept, these skills form the part of tacit knowledge resources of an organization and therefore, libraries are focusing on developing KM competencies and skills of LIS professionals. (Husain & Nazim, 2013)

Challenge 3: Optimum Utilization of Library Sources and Services

This is another major challenge of libraries today because it is quite evident that libraries have been making efforts to adapt to the changing information environment such as incorporating technologies to speed up their housekeeping operations, improve and expand their storage facility (maintaining e-resources, archives, networking like resource consortiums etc.), developing innovative library services (online reference service, online issue and return facility, remote access of library collection, display of information related to latest events and updates on blogs, websites), etc. But the problem of underutilization of library sources and services still persists. There could be several reasons for this condition like unawareness of various library facilities among users, improper or ineffective classification and cataloguing skills of LIS professionals, poor retrieval skills of users, lack of interaction between user and library staff, lack of enough marketing or promotion of library products and services etc.

The whole concept of KM is based on adopting a holistic approach towards an organization in which every single entity or aspect is considered equally important and capable of causing significant impacts upon their decision-making and final outcomes. Everything that an organization owns, is considered knowledge asset (Kim, 2000). So, the term 'knowledge' includes all kinds of explicit, implicit and tacit information as raw materials that have to be transformed into productive resources. This approach helps libraries to critically analyze each and every aspect of their different elements in order to identify the reasons of their bottlenecks and also to create methods to deal with them effectively and efficiently. For instance, SWOT analysis could help a library to become aware of its own particular strengths, weaknesses, opportunities and threats that would help it to put time, money and efforts in the right direction and to avoid the risk of indulging in aimless and futile attempts. The optimum utilization of library sources and services is possible by ensuring awareness among people, increasing visibility of the collection, marketing and promotion strategies and improving technical skills and interaction with the users.

Challenge 4: Financial Support

Finance plays an important role in every kind of institution or organization. However, it becomes a more critical issue in case of not-for-profit or service

institutions including libraries and information centers. Inadequate budget has always been a major problem of all kinds of libraries and the continuous rise in the cost of reading materials, rapid technology advancements, library maintenance expenses, changing demands of users etc. make the situation worse and financial management becomes a great challenge (Jain, 2013). This justifies the need and importance of concepts like KM for libraries because it emphasizes on treating the available knowledge resources as an asset that have to be properly identified, organized, analyzed and examined in order to come up creative methods and innovative strategies to deal with the current situation.

The concept of KM basically belongs to business organizations and it has not been many years since its application was suggested for non-profit organizations and today, it has become a trend. One major reason for the inoffensive acceptance of this new application is that KM fosters the idea of self-dependence which is the motto of every service institution. Networking of library documents and services is one way of dealing with financial crunch. Libraries are working towards the acquisition of open access software and reading materials in order to get rid of their complete dependency on costly software and subscribed resources. They also started providing customized services at minimal charges that could help them to generate finance on their own.

Challenge 5: Competent Library Staff

Human resources are among the vital resources of an organization because they are not only the harbingers of ideas but also the executors of all plans, strategies or changes happen in the organization. They are coordinators of the activities of different departments. The development of strong human power is important for all organizations. In the context of library, there is a shift in the position of LIS professionals from being the storekeeper or preserver to the disseminators of information and knowledge. And this shift demands more qualities in LIS professionals. Besides considering the good qualifications, communication and technical skills as essential qualities for a strong library staff, KM encourages the use of tacit knowledge of human resources to get a stronger and more competent library staff. (Kim, 2000)

It is important to provide library staff a platform to share their ideas, experiences and expertise so that they can learn from one another, improve their knowledge and skills, avoid repeating mistakes and also libraries would not regret the absence of talented and valuable staff in case of their leaving or retirement. For instance, various library events, meetings, seminar and conferences have been started organized on regular basis to discuss library issues and more and more LIS professionals should participate in them and share their ideas, views and opinions in order to stay updated and informed of

current changes in libraries. Similarly, regular training programs are helpful for their continuous professional development. (Asogwa, 2012; Gerami, 2010)

Challenge 6: Strong IT infrastructure

It is evident that technology has a huge impact on each and every sector of knowledge society and library has never been an exception. With the passage of time, libraries have been transformed from physical to electronic, to digital and now to virtual form and the first and major reason for this transformation is rapid technology advancements. Adapting to technological changes has always been a great challenge for libraries and this will not get less challenging in future as well. It has already been recognized (by LIS professionals) years ago that there is no any alternative but to embrace the change as quickly and efficiently as possible. The use of information technology (IT) as a tool is an example of KM application in libraries (Shanhong, 2002).

Building a strong and sufficient IT infrastructure is a challenge for libraries (Jain, 2013), because of the high cost of both purchasing and maintenance of software and hardware. The application of KM concept to deal with this particular challenge demands considering every minute details related to the acquisition of software and hardware. Proper knowledge, assessment and evaluation of different hardware and software available in the market are required and selection should be made on the basis of requirements of libraries. Different open- source library software like KOHA, Evergreen, DSpace, GSDL etc. have been emerged as an alternative for libraries (especially those libraries which can't afford costly software) and there are many studies showing the adoption of open-source software on wider level. Similarly, libraries can use different emerging technologies in order to achieve more efficiency and satisfy today's tech-savvy users.

Conclusion

The basic idea of KM is about knowledge empowerment which makes this concept both suitable and relevant for non-profit organizations or service institutions like libraries and information centers. Because, unlike profit-making organizations, a library cannot increase its expenditures with increasing cost of library sources or demand of users or other kinds of challenges. There is always a pressure of spending each penny of the budget cautiously and because of this the library is unable to implement most of their ideas or plans. Consequently, it has to keep looking for best alternatives in order to achieve more in less. And KM concept helps to find those alternatives.

Some of the major challenges faced by libraries in today's knowledge era have been discussed in the present study, i.e., (a) Survival (b) Quality library collection and services (c) Optimum utilization of library sources and services

(d) Financial dependency (e) Competent library staff (f) Strong IT infrastructure. The survival challenge emerged as the consequence of increasing competitive environment including other information systems in the scenario. KM concept inspires a library to focus on those aspects which make it different from other information systems. Building up quality information sources is a challenge because of the availability of abundant information around and KM helps in the selection of those particular sources that would cater to the needs of majority of users in more satisfactory manner. The optimum utilization of library sources and services has become a challenge because of changing users' needs and demands, lack of interaction between LIS professionals and users, lack of awareness among users, etc. KM focuses on the proper assessment of user needs and requirements, proper examination of the causes of underutilization of library sources and proper observance of changing information environment at global level and its impact on libraries etc.

In a nutshell, the tacit knowledge of library is very important and it would not be wrong to interpret it as the harbinger of major change in LIS field. For instance, the tacit knowledge, existing in the form of creative intellect, competencies, skills, experience and expertise of LIS professionals, play a major role to overcome the above discussed challenges of libraries.

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15

Usage of Social Media: With Special Reference to Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior (M.P.)

Dr. Ramnivas Sharma, Dr. Nidhi Srivastava & Dr. Manoj Kumar Tiwari

Abstract

The quantity of users of famous online media destinations is developing dramatically. Online media tools are significant this time as all libraries is shut in COVID-19. In light of this reality, most libraries have added interpersonal interaction webpage connections to their sites. The possibility of linking an interpersonal interaction webpage to a library's site permits supporters to effectively talk about library use issues with specialists and urges to the library. WhatsApp and Facebook are the most broadly utilized web-based media/platform for library administrations. These kinds of web-based media apparatuses endeavour to clarify the significance of online media devices in the COVID-19 period, as they are only a path for scholastics and understudies to proceed with the instructing cycle (also learning).

Keywords: *Social Media, Communication, RVSKVV, Gwalior, etc.*

Introduction

Social Media is a powerful new form of communication. The number of users on popular social media sites is growing at exponential rate.

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior (M.P.)

The "Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya" (RVSKVV), Gwalior was established by Govt. of Madhya Pradesh vide ordinance No.4

of 2008. As per RVSKVV act (No. 4, year 2009), the territorial jurisdiction of the Vishwa Vidyalaya is spread over 26 districts of Madhya Pradesh encompassing five Colleges (four Agriculture, and one Horticulture); five zonal Agriculture Research Stations (ZARS); four Regional Agricultural Research Stations (RARS); Six Special Research Stations (SRS) and 19 Krishi Vigyan Kendra's (KVKs) and 24 All India Coordinated Research Projects. Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior has competent human resources for managing the activities of agriculture and allied sectors and is playing a pivotal role in the holistic growth and development of agriculture in the state.

Objectives of the Study

The objective of this study was: -

1. To assess the prevalence of social media usages of RVSKVV, Gwalior,
2. To find out the different tools associated with social media.
3. To find out the different social media platforms.
4. To find out the time used in social media usages.
5. To find out the various factors associated with social media usages.
6. To assess the problems related to social media usage among the study and personal life.

Limitations of the Study

The present study is an attempt to assess and evaluate the usages of social media of Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior (M.P.). So for this purpose (data collection), I have drawn Google Form and communicate with university M.Sc. students through WhatsApp groups. The Target audiences of this study are university students. Against a total of 200 students, 191responses were received. The data thus obtained are analysed and tabulated.

Methods of the Study

A survey method of research was used. A structured Google form was prepared and distributed among Students' WhatsApp groups. Selected 200 students and received back 191 filled forms. The collected data from the students were checked, tabulated, and analysed. The Google Docs consists of questions regarding general details such as age group, Gender, Use of social media, the purpose of Social Media usages, Tools, Platforms, Usages Time, the effect of social media, and problems of social media.

Age Group of the Students/Respondents

Table 1: Age group of the Students/Respondents

S. No.	Age Groups	No. of Students	%
1	Less than 20	42	22
2	21 to 25	134	70.2
3	26 to 30	15	7.9
Total		**191**	**100**

Table 1 show that what is the age-wise distribution of students/ respondents. Table clearly shows, that 134 of the total students (Respondents) under 21 to 25 age group, 42 of less than 20 age. All most all students are interested in social media use.

Student/Respondents Types (Gender)

Table 2: Student/Respondents Types (Gender)

S. No.	Student/Respondents Types	No. of Students	%
1	Male	134	70.5
2	Female	56	29.5
3	Not Answered	1	
Total		**191**	**100**

Table 2 clearly shows, 134 of the students covered in the study is male and 56 of the students are female.

Use of Social Media

Table 3: Use of Social Media

S. No.	Use	No. of Students	%
1	Yes	189	99
2	No	2	1
Total		**191**	**100**

It is clear from the table 3, all students (189 out of 191) are using social media. Majority of students are use Social Media.

Purpose of Social Media Usages

Table 4: Purpose of Social Media Usages

S. No.	Purpose	No. of Students	%
1	For study	146	76.4
2	For Entertainments	13	6.8

S. No.	Purpose	No. of Students	%
3	For Blog Writing	0	0
4	For Chatting and Discussion	17	8.9
5	For Social Issues	5	2.6
6	Others	10	5.2
Total		191	99.9

Table 4 shows that with regards to the purpose of Social Media usages. Majority of students are using social media for study (146 students out of 191). The main purpose of Social Media Usages is study. Other purposes are: - entertainment, blog writing, chatting and discussion, social issues and others.

Tools of Usages of Social Media

Table 5: Tools of Usages of Social Media

S. No.	Tools	No. of Students	%
1	Smart Phone	183	95.8
2	Desktop	1	0.5
3	Laptop	6	3.1
4	Other	1	0.5
Total		**191**	**99.9**

Today, lots of social media tools available for students community. They using Smart phone, Laptop, Desktop etc. Table 5 clearly shows that 183 students out of 191 are using smart phones and rest students are using Laptop (6) and Desktop (1) etc.

Social Media Platform

Table 6: Social Media Platform

S. No.	Social Media Platform	No. of Students	%
1	WhatsApp	133	70
2	Facebook	11	5.8
3	Twitter	8	4.2
4	Instagram	20	10.5
5	Other	18	9.5
6	Not Answered	1	
Total		**191**	**100**

It is clear from the table 6, 70% students (133 out of 191) are using WhatsApp as a social media Platform. 10.5% students are using Instagram and 9.5% students are using other platform. 5.8% students are using Facebook and 4.2% are Twitter.

Usages of Social Media (Time-Per Day)

Table 7: Usages of Social Media (Per Day)

S. No.	Usages of Social Media (Time- Per Day)	No. of Students	%
1	Less than 1 hour	26	13.7
2	1 to 2 hours	72	37.9
3	2 to 3 hours	45	23.7
4	3 to 4 hours	21	11.1
5	More than 4 hours	26	13.7
6	Not Answered	1	
Total		191	100

Table 7 clearly shows that 37.9 % of the students are spent the social media 1 to 2 hours in a day, 23.7 % of students using the social media 2 to 3 hours in a day. 11.7 % of students spent the social media 3 to 4 hours in a day.

Effect of Social Media use on Students Social Life

Table 8: Effect of Social Media Use on Students Social Life

S. No.	Effect of Social Media	No. of Students	%
1	Agree	159	83.7
2	Disagree	15	7.9
3	Don't Know	16	8.4
4	Not Answered	1	
Total		**190**	**100**

Table 7 show that the majority 159 students are agree concept "Effect of Social Media use on Students Social Life" and 15 students are disagree this concept.

Problems of Social Media

Table 9: Problems of Social Media

S. No.	Problems of Social Media	No. of Students	%
1	Lack of Social Media knowledge	11	5.8
2	Speed of internet	34	18
3	Difficulties of Receiving Proper Information	39	20.6
4	Detection and Identification of fake messages	68	36
5	Other	37	19.6
6	Not Answered	2	
Total		**191**	**100**

Social media is a very important media of communication, but some problems related to social media are: - Lack of Social Media knowledge, Speed of internet, Difficulties of Receiving Proper Information, Detection and Identification of fake messages etc. 36 % students are facing Detection and Identification of fake messages problems and 5.8 % students are facing lack of social media knowledge.

Conclusion

Social Media plays a vital role in the field of personal and social life. Without Social Media, I cannot imagine it in today's time, like personal and professional life, because people totally depend on social media. Social media is a fast and easy communication medium. They are very good and sometimes very bad, especially in students' life. Students are used lots of time on social media chatting. Students are facing are fake news, child pornography, personal safety, and many more problems. So, please use social media in a healthy way.

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16

Utilizing Social Media Platforms for Information Dissemination: From the Viewpoint of Public Libraries in India

Kriti Soni

Abstract

With the perpetual technological breakthroughs, a Library Professional is expected to provide updated information in the latest format possible to its information seekers. In a Public Library scenario, where scarcity of funds and resources is a common picture, information generated can be uploaded or disseminated using social media platforms as it is a preferred medium by people of all age groups to interact, communicate or share informational content. In order to channelize the focus of millennials towards positive use of technology, Information Professionals can utilise these platforms for marketing of in-house information products and services. For this, the professionals need to be adaptive of technological transitions in order to utilise its services for marketing to a wider audience. The information services through online medium can be offered even in the times of crisis where readers are not in a position to access libraries physically. This article emphasizes on tapping the potential of multiple social media channels as a marketing tool to approach communities at large and include their social circles.

Keywords: *Information society; Blogs; Social Networking sites; Digital Consortiums; Customised Information Services, Digital device penetration*

Introduction

Social Media has become an inevitable platform where freedom of expression is exercised by all age groups to convey thoughts, express feelings or speak one's mind. Mobile, tablets, laptops in the hands of people have become a common sight in almost every household, office, marketplace, station and

other public places. There are various social media platforms available for free or at a minimal charge where the internet acts as a prerequisite to explore the world of pre-existing information or post content created by its users which can be shared with people connected by the same platform. Most used social media platforms, for educational, personal or business purposes depending upon the requirement of its patrons are Facebook, Twitter, YouTube, Instagram, WhatsApp, Telegram, Snapchat among many others. If these platforms or mediums are professionally utilized to reach the target audience, sharing of information by peers among social groups will increase manifold to reach the concerned audience. Many private firms, despite allocating a substantial part of revenue in broadcasting commercial advertisements, also take a parallel approach towards social media platforms to target digital millennials. These publicizing strategies of social media platforms can also be implemented by Public Libraries with limited available resources to reach the masses.

Thus, Public Libraries can resort to these platforms as information is disseminated without any charge or with a minimal charge, depending upon the publicity or visibility requirements. Information concerning registration for forthcoming events, the launch of new services or information products, regular updates about subscribed databases, change in Library timings, if any among many others can be effectively shared in real-time by Public Libraries. While the information or content shared over media platforms have their strengths and weaknesses and with the use of social media where every person, whether in possession of the knowledge concerned or not, can judge the content and post reviews, the content becomes vulnerable to a variety of reactions. Hence, necessary instructions outlined by Public Libraries can act as a guiding light for its Media Team while uploading any pre-approved content to cease the chances of misleading cross-posting.

Public Libraries

"A Public Library is an organization established, supported and funded by the community, either through local, regional or national government or through some other form of community organization. It provides access to knowledge, information and works of the imagination through a range of resources and services and is equally available to all members of the community regardless of race, nationality, age, gender, religion, language, disability, economic and employment status and educational attainment.

The existence of Public Libraries in India dates long back when it was seen as a tangible place hundreds of years ago but in the present context, using the services of the Web, people have been seeking easy-to-use information through a variety of online media available. The purpose remains the same, to interact with the keepers of information and get a variety of literature through credible sources.

Public Libraries in India function with limited resources as these are financed by annual grants from the Government, hence hiring a team with professional marketing skills can cost a fortune for these Libraries. Thus, a Public Library can resort to social media platforms for marketing their services, activities and information products for free or against a nominal fee. Thus, with a wider outreach to the masses, social media platforms can prove to be a vital tool that can be utilized to entertain the informational thirst of its readers.

"The role of the public libraries is still discussed and questioned from time to time, partly because of their strong image of being physical spaces. The discussions often surround issues concerning collections, the organization of information, the provision of information, and the role of libraries in the digital age."

Social Media

"The Web, Public Libraries, and social media are a part of the information society. Public Libraries and the Web have been seen as important information mediators in this society and continue to influence the way in which people handle information." (Kronqvist-Berg, Maria, 2014)

Social Media platforms may not be approached by its users to seek information as it is generally used as a medium of interaction, a communication tool, or as a means of entertainment. It is upon Public Libraries to utilize this platform for channelizing the attention of its patrons to informational content which may be of use for them. There are numerous social media tools available that can be used to suit an organization's infrastructure and become a means to provide a personalized approach with customized information services. Below mentioned are prominent social media tools that can be easily and swiftly implemented at a low cost: -

1. ***Blogs-*** A blog is a form of online publishing which has gained significant popularity since its emergence in the 1990s. A blog is a set of pages created in a sequential order by its author to share experiences, feelings, post links of useful content or sites. A Blog must be dedicated to a particular genre like travel, sports, fitness, supporting any educational curriculum or profession. Accordingly, the concerned audience will follow the blog page to get more updates on the subject matter. In addition to textual blogs, the author can also share photos, audio clips, and video clips which are organized chronologically in reverse order to alert followers with the most updated content. The National Library of Australia which is the largest Reference Library in Australia maintains an official Blog page "https://www.nla.gov.au/stories?type=blog_post" which includes a collection of unbound magazines, podcasts, current and archived newspapers in digital

format and much more. This can be a guiding example for Public Libraries in India to create a Blog as a complementary library's web service to post regular informational content concerning products and services of the library.

2. ***YouTube-*** It is a platform where a user creates a channel to post video content that can be viewed by other users connected by the same platform. A dedicated YouTube channel can also be created by a Public Library to upload a range of videos such as Virtual Tour of Library, OPAC tutorial sessions, debates on important topics of general awareness, educational videos and many more to be viewed not only by readers but masses in general. Serving the information needs of the society must be the prime objective of a Public Library which can be very well exercised digitally with the help of this social media tool to enhance visibility as Netizens are increasingly approaching YouTube as a learning platform.
3. ***Telegram-*** This is yet another free, open-source software used for sharing documents, messaging to an individual or a group of people sharing the same interests. Public Libraries can make a separate group of readers based on their reading interests and share e-books, post informational content on regular basis.
4. ***LinkedIn-*** It is an employment-oriented service launched in 2003 to provide a platform for professional networking. It allows job seekers and employers to create profiles and build connections to represent real-world professional relationships. Public Libraries can use this platform for hiring professionals, approaching subject experts or academicians, inviting speakers for conferences and events or collaborating to work towards the development of the profession, thus benefiting its patrons.
5. ***Social Networking Sites****:* There are many social networking tools available since the 1990s that enables users to access social circles of their contacts or friends. Social networking sites compose an enabling environment for professionals and users of a Public Library to engage in knowledge sharing activities. Following are prominently used social networking sites:
6. ***Facebook-*** Since its launch in 2004, Facebook has been working toward the prime objective of connecting people all over the world. Connections can prove vital if exercised with an objective. Public Libraries can utilize this platform for advertising events being organized and provide online registration facilities to encourage footfall. Efforts must be directed towards engaging more and more people in the community circle to increase participation and gain publicity. A press report of the same can also be uploaded to enlighten viewers about the proceedings

and impact of the session. Library of Congress which is the de facto National Library of the United States has been uploading content of different genres on its official Facebook page (The Library of Congress) to reach out to all people with varied interests. Its "Friday Fun Day with Scholastic" videos are most featured among children that include a wide range of activities from cartoons to drawing tutorials.

7. ***Twitter-***Twitter allows the expression of thoughts/ words /feelings put together with a word limit to be broadcasted as a "Tweet" which can be re-tweeted by those in support of the expression to reach a wider audience. Twitter is yet another media that can be used by a Public Library to promote events and present news with the objective of dissemination of information as it is trending among educationists, politicians, film stars. As quoted in TIME Magazine, former President of the United States, Donald Trump considers his tweets to be official White House statements, according to Press Secretary Sean Spicer (Aric Jenkins,2017). Ministries or departments working under the Indian Government and its leaders have official Twitter Handles for broadcasting information or announcements which are now considered official.

It is of prime importance for a Public Library to have a media plan and knowledge of services to be broadcasted and user preferences before opting for one or more social media platforms. Sample feedback in its initial stage can also act as a guideline to help them achieve the objective of an effective information provider.

Indian Public Libraries Engaged in Social Media Activities

A comparative study of prominent Public Libraries in India which operates under the administrative supervision of the Ministry of Culture, Government of India has been conducted through its respective websites and uploaded annual reports. This will enable an insight into the activities/resources publicized by these Libraries and their engagement with the millennials with the aid of social media tools.

P*rominent Public Libraries in India are:*

- The National Library
- Rampur Raza Library
- Khuda Baksh Oriental Public Library
- Delhi Public Library
- The Central Secretariat Library
- Raja Rammohun Roy Library Foundation

Table 1: A comparative study of some of the services provided by prominent Public Libraries in India

	The National Library, Kolkata	**Rampur Raza Library, Rampur**	**Khuda Baksh Oriental Public Library, Patna**	**Delhi Public Library, Old Delhi**	**The Central Secretariat Library, New Delhi**	**Raja Rammohun Roy Library Foundation, Kolkata**
Membership (approx.)	40,000			1,89,235		
Collection	26,41,615 Documents	89,000 Documents	2,84,000 Documents	16 lakh Documents	8,50,000 Documents	40,000 documents
Reference						
Manuscript						
Inter Library Loan						
Reprographic						
Online Journals/ Serials					Proposed	
Book Donation						
Mobile Library						
Braille Books						
Rare Books						
Children Section						
Source of information as of August 2021	Website & Information brochure published on 1st March 2017)	Website & 2015-16 Annual Report	Website & 2015-16 Annual Report	Website & Annual Report 2019-20	Website	Website & Annual Report 2018-19
Website Last updated on	14/07/2021		12/07/2021		05/08/2021	20/07/2021

While above mentioned Public Libraries have been offering essential services to its patrons, these services are not publicized through its official social media platforms. There has been very less number of subscribers on official handles of these Information Centres which clearly states that social media is not a preferred medium for information dissemination in most cases. While Public Libraries in most developed countries have been very active in providing anytime information services through its website, blog or social media accounts, Indian Libraries too, can work on the same pattern to keep its patrons informed at all times.

Table 2: Presence of Prominent Public Libraries on Social Media Platforms

Information fetched as on 09 August 2021	The National Library, Kolkata	Rampur Raza Library, Rampur	Khuda Baksh Oriental Public Library, Patna	Delhi Public Library, Old Delhi	The Central Secretariat Library, New Delhi	Raja Rammohun Roy Library Foundation, Kolkata
Facebook Followers	1,710	10,456	1745	3942	781	2686
Twitter Followers	667	1782	--	2013	638	1409
Instagram Followers	204	--	--	578	--	--
YouTube Followers	331	98	03	111	02	497

There is a huge scope for utilizing social media platforms by Public Libraries. Regular updates with respect to posting SDIs, event announcements, open competitions will ensure more participation and greater reach to the masses. For this, a dedicated team of professionals must be hired with experience in Media handling who may work under the direct supervision of Heads of the Organisation to ensure timely updating of any news/informational content. A series of managers through the line of command may delay the process of getting approvals for posting information. Also, since Media being a delicate department with a lot of cybercrime in the picture, a detailed documented guideline for these Media professionals shall help them in the adverse events, if any.

Benefits For Using Social Web Technologies

Social media can be seen as an essential marketing tool with wider outreach to the masses in general. Hence, tapping the potential benefits of using social media platforms, Public Libraries can consider the following advantages:

1. ***Instant content sharing*** - Ideas or informational content can be shared anytime, anywhere even beyond official hours and no technical setup is required for content uploading. This service is flexible and does not necessarily need a laptop for updating the latest information.
2. ***Creating a wider social community of Library Professionals and Users***- Communities with common interests contribute to the development of the concerned field. Such a social community may not necessarily include experienced professionals of different Libraries but also its

users who shall be benefitted from the expertise of these professionals and their enriching experience.

3. ***Nominal marketing cost involved***- These services also require considerable marketing to reach out to regular and potential information seekers. The need for marketing lessens if content updated is regular and relevant, it will be shared among communities by professionals to help their subordinates thus gaining momentum in the number of followers and ensuring wider outreach.
4. ***Enhances quality of interaction anytime anywhere***- In this digital era, information can be consumed anytime anywhere which enhances the prospects of user's engagement and interaction. This can be exercised by Public Libraries to set up a Global Help Desk to solve queries of users concerning digital or e-learning resources and to improve subject content to suit learner's needs.

These benefits are especially attractive to public libraries considering that many of them are suffering from budget cuts and facing various contemporary challenges such as competition with the internet (Miller, 2008).

What Can Be Done by Public Libraries?

For social technologies to be used effectively by Public Libraries, they need to engage users and offer a welcoming entry point to library services (Smeaton, K., & Davis, K. (2014). A Public Library can focus on creating web-based content on the lines of the topic of interest of a majority of its followers. The information uploaded must be regular and updated to ensure the stability of its subscriber count. Following are some of the initiatives, which a Public Library can adopt:

1. ***Setting up a Digital Consortium –*** Digital Consortiums through Cloud Computing can be formed by Public Libraries in collaboration with educational institutions or deemed Universities as many libraries are providing access to digital resources individually. The participating institutions in the Digital Consortium can share the cost of subscription of electronically available resources and provide an access to a variety of digitally available content to its clientele**.**
2. ***Mobile Libraries-*** In disaster situations like epidemics, floods, earthquakes, where users may face lockdown situation and can avail only essential services like medical aid, items of daily need, books/ journals must be considered as an essential service too. To utilize such lockdown period for knowledge enrichment of its users, necessary arrangements must be made by Public Libraries to deliver books at the doorstep of its readers especially for old age people who are not internet savvy and rely mostly on print media. For this, a user

database needs to be maintained and updated regularly to provide timely services. In such a situation, social media tools can be utilized to publicize this service with respect to the area and date/ time of mobile buses.

3. ***Customized Digital Information Services–***An online information service can be initiated by a Public Library which provides updates on a variety of topics ranging from general awareness to subject specific knowledge. These topics can be publicized over social media to generate subscribers who will get regular updates on the topics subscribed by them. For example- Information Watches are compiled digitally by the Information Resource Centre of Tata Consultancy Services Ltd. on a daily/ weekly basis which is mailed to readers upon subscription. The subscribers of these information watches get current updates on the topic concerned with a credible source link to verify the information. A Public Library can also take inputs from its readers to launch such a service which provides them with customizsed information in digital form on the topics subscribed by them.
4. ***Create Discussion groups/ communities-*** Public Libraries can create discussion groups and communities to provide a platform for professionals or experts of a specific domain where they can share their knowledge based on their enriching experiences. Young professionals can be benefitted by being an audience to stories of real-life challenges of the speakers and may get motivated to overcome their professional hurdles. Concerns or issues by freshers while conducting professional activities may also be discussed on these platforms to get real-time solutions by experienced officials.
5. ***Keep a Backup plan ready for times of crisis-*** If a time of crisis arises like flood, earthquake or epidemics in the future where readers cannot physically visit the Library, a Public Library must have a backup plan to ensure uninterrupted services to its readers through digital means or social media. A parallel information approach through digital mediums may come to the rescue of readers of Public Libraries as they will be able to access digital information products to remain updated.
6. ***Upload educational or entertainment videos –*** Social media tools can be used by a Public Library to broadcast live sessions and to publicize videos uploaded on the website. Library of Congress has a special collection of audios/ videos available which is advertised through its official Facebook page (The Library of Congress). A brief introduction and bibliographical details of the video can be posted every day with the tagline "Video of the Day" to give an insight to its viewers. Webinars can be publicized using Social Media tools targeting different age groups to conduct educational sessions which allows participation

from different countries also. These webinars are seminars executed online in order to impart knowledge or skills to the interested audience through a variety of video conferencing software available.

Barriers in Using Social Web Technologies

While every coin has two sides, thus with advantages come certain issues or challenges which can obstruct the motive of Public Libraries to adopt social media technologies as a marketing tool. For this, appropriate resolution can be sorted by a dialogue with the Competent Authority to get the necessary support.

1. ***Institutional-*** Management or Library Board may not provide necessary approvals to market information products on social networking sites as they are commonly seen as a medium of social interaction only. Also, problematic terms of use and security risks might be considered as a hindrance by some parent organizations.
2. ***Technological or Digital Device Penetration-***Lack of technological knowledge or technical assistance from staff may cause problems as only tech-savvy members may take interest. Thus, the initial implementation phase may not involve issues but technical sustainability, as well as dependence on the third party for copyright licensing, may cause technological barriers. Also, not all users of digital India are connected to the internet or tech-savvy to completely switch to digital means.
3. ***Credible content-*** There is a vast universe of information available on the internet but it is difficult on the part of a general user to distinguish between authentic and fake information, credible and non-credible sources, reliable and twisted facts. It takes experience and knowledge of parameters to verify the credibility of the content shared over social mediums. Hence, credible sources can be linked to prove information as authentic.
4. ***Regular Maintenance-*** A service once started must be regularly updated to retain its clientele and thus require a dedicated team that works towards content enrichment, marketing and reaching a wider audience with the most relevant content. Information gets redundant if not updated regularly or has the potential to satisfy the informational thirst of its readers
5. ***Visibility on the Web-*** Libraries implementing this approach have to actively promote the web service to assure its visibility on the Web and reach the targeted audience as it is the age of information explosion where information gets obsolete in due time.

Conclusion

Social media tools are content-driven, means it is solely operational based on the relevance of information created or shared. Since Public Libraries serve a major chunk of the population in comparison to community libraries, their user database is huge which can be initially approached to share information products or services through online mediums. But, to continue to excel in such online services, Public Libraries need to provide necessary managerial, financial and technical support to a dedicated team of social media personnel. This team may be hired to dedicatedly focus on content creation, its management, uploading and applying appropriate marketing skills to reach the targeted audience and approach their social circles. Regular suggestions or feedback from users can further help in content development to suit their information needs and bring together readers to form community circles based on their reading interests. Public Libraries in India, influenced by western countries have been engaged in providing services through digital means but the effectiveness of any service is enhanced after continuous improvements. Thus, by tapping the potential of multiple social media platforms to market its information products and services, Public Libraries can overcome its financial constraints and still reach current and potential users.

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17

Use of Social Networks by the School Students During COVID-19 Pandemic: A Study of Kendriya Vidyalaya in India

Dr. Anil Kumar

Abstract

Present paper is an attempt to study the use and effectiveness of Social Networking Platform in school education during COVID-19 pandemic by the students of senior secondary classes at Kendriya Vidyalayas of Varanasi region (India). The study was conducted through a well-structured questionnaire distributed among the students of all the Kendriya Vidyalayas (27) of Varanasi region. It was found that most of the students are aware and using social networking platform for their online classes and day to day study/ learning. Majority of the students who are taking online classes are using Google-Meet followed by Zoom. The study also revealed that majority of the students is attending their online classes through Smartphone as accessing tool.

Keywords: Social Networking Sites (SNSs), COVID-19, Google-Meet, Google-Classroom, Zoom.

Introduction

Since November - 2019 whole world is facing COVID-19 Pandemic which is very badly affected almost all type of economical, social, educational and cultural activities all over the world under which educational sector is affected most where all the educational Institutions were closed and all the students were bound to stuck inside their houses. Scientist Doctors and health professionals are working round the clock tirelessly to limit COVID-19 to further spread. COVID-19 is a new strain of corona virus which is never seen

before in human with symptoms such as fever, cough, loss of smell, difficulties in breathing, sore throat, tiredness etc.

In India Kendriya Vidyalaya Sangathan is a primer and brand Institution in school education which is having more than 1200 schools with around 13 lacks students from class 1 to 12 divided into 25 regions across the country. But in such tuff time social networking played a very crucial and important role to connect all the human being to each other through Internet and World Wide Web. The educational sector experienced a new type of revolutionary change during this time where educational activities are being conducted smoothly through social networking platform such as YouTube, Google classroom, Google-Meet, Zoom, Cisco-WebEx, Face book and so on. Social Networking playing a key role to connect the communities to each other without any boundary to share their experiences, feelings, emotions, personal and professional information etc. to strengthen their personal and professional relation.

Literature Review

Kumar and Singh (2016) find out the role of social media in scholarly communication used by faculty members of school of social science Mizoram University and originate that majority of the faculty members who are using social media are in the age group of 31-40 years. The study also concludes that Facebook is the most favored social media followed by the LinkedIn in all categories of the faculty members. Mahajan et al. (2013) tried to find out the use and purposes for accessing social networking sites by the research scholars of Punjab University Chandigarh. The result shows that majority of the respondents were aware and using social networking services in their research work. The study also revealed that Facebook is the most popular SNSs by all the researchers. Chakraborty (2012) finds out the activities and purposes of accessing SNSs by the research scholars of North-East Hill University Shillong and resulted that majority of the respondents from social science stream and using it for group discussion in input matters, new concept etc. Singh and Gill (2011) found under a study on the use of social networking sites by the research scholor of Guru Nanak Dev University Amritsar. In their study they found that social networking sites are useful for all the researchers, they observed that most of research scholars are aware of SNSs and they found that most of scholars used Facebook followed by Orkut. The study reveals that using social networking sites is very easy and user friendly. Praveen (2011) pointed out the alternates and use of SNSs by LIS professional in the University library of Uttar Pradesh and find that most of the LIS professionals are well aware about Facebook as it provides them a vital platform to share their views, ideas, emotions and so on.

Significance and Scope of the Study

It is established fact that the influence of social networking is the most effective and remarkable tool in information dissemination during COVID-19 pandemic which bring revolutionary change in educational sector and cop up their study. Social networking sites have huge potential to disseminate the information cheaply and speedily. The present study is restricted to the senior secondary students of all the Kendriya Vidyalayas (27) under Varanasi region of Uttar Pradesh, India.

Objective of the Study

The present research has the following specific objectives:

1. To find out the use and effectiveness of SNSs in school education especially in KVS during COVID-19 pandemic.
2. To know the commonly used platform for learning by the students during COVID-19 pandemic
3. And to find out the problems/barriers being faced by the students while using these Social Networking platforms.

Methodology

To collect the primary data the survey method of research was performed and a Questionnaire was used as data collection tool where a structured questionnaire was prepared and distributed in the month of July –August 2020 among the randomly selected students of 27 Kendriya vidyalaya under Varanasi Region Uttar Pradesh through email. There are total 36 Kendriya Vidyalayas under Varanasi region whereas only 27 Kendriya vidyalayas are running the senior secondary classes (Class-XI & XII) effectively.

Sampling

In all the 27 Kendriya Vidyalayas under Varanasi region having 3105 students in class XI and 2095 students in class XII which were enrolled in the academic session 2020-21. It was difficult to cover all the population i.e., 5200 so that the representative sample was formed by taking approximately 5% of the students from all the 27 Kendriya Vidyalayas under Varanasi region.

Data Analysis and Interpretation

Total 260 questionnaires were distributed among randomly selected students through email out of which 195 (75%) respondents have responded which have been analyzed using statistical package for social science (SPSS)

and MS-Excel and their interpretation have been undertaken in the light of the framed objectives.

Gender-wise Distribution of the Respondents

Table-1 shows the gender wise distribution of the respondents which indicates that in class XI there are 73 (37.43%) are male students and 42 (21.54%) are female students, whereas in class XII 46 (23.59%) are male students and 36 (17.44%) are female students. Where mean value of male students is 59.5 (SD=19.09) and for female students 38 (SD=5.65).

Table 1: Gender wise distribution of the Respondents

Gender	Class-11	Class-12
Male	73 (37.43%)	46 (23.59%)
Female	42 (21.54%)	34 (17.44%)

(N=195)

Commonly Used Social Networking Platform by the Respondents for Online Classes

Table-2 present the commonly used SNs platform by the respondents during COVID-19 pandemic for taking online classes which indicates that 7 (3.59%) of respondents are using YouTube, whereas 10 (5.13%) of respondents are using Google Classroom, whereas most of the respondents i.e., 112 (82.56%) are using Google Meet and 11 (3.64%) are using Zoom and only 6 (3.08%) of the respondents are using other Social Networking platform like Cisco-WebEx, Facebook etc.

Table 2: Commonly Used SNs Platform by the Respondents for Online Classes

SNS Platform	Students
YouTube	7 (3.59%)
Google Classroom	10 (5.13)
Google Meet	112 (82.56%)
Zoom	11 (3.64)
Others	6 (3.08)

(N=195), Mean = 29.2, Standard Deviation=46.33.

Accessing tools used by the Respondents

Table- 3 present the data about devices that are being use for accessing social networking platform to attend online classes during COVID-19 pandemic which shows that most of the respondents i.e. 157 (80.51%) are using Smart Phones as a tool, whereas 31 (15.9%) of respondents are using Laptop

as tool, and only 7 (3.59%) of respondents are using personal computer as tool for accessing social networking platform for their day to day study/learning.

Table 3: Accessing tools used by the Respondents.

Assessing Tools	Respondents
Smart Phone	157 (80.51%)
Laptop	31 (15.9%)
Personal Computer	7 (3.59%)

(N=195), Mean=65, Standard Deviation=80.57).

Purposes of Using SNS by the Respondents

Table-4 presents the purposes of using social networking sites other than online classes by the respondents during COVID-19 pandemic, which indicates that 27 (13.85%) of respondents are using it to find e-books, whereas 39 (20.00%) of respondents are using it to find e-magazines, whereas 21 (10.77%) of respondents are accessing it to get e-newspapers, whereas most of the respondents i.e. 64 (32.82%) are using SNSs for instant massage/chat, 33 (16.92%) of respondents are using it to find their relevant information and only 11 (5.64%) of respondents are accessing social networking sites for other purposes like find friends, entertainment etc.

Table 4: Purposes of Using SNS by the Respondents during COVID-19 pandemic

Purpose	Respondents
Finding e-books	27 (13.85%)
E-magazine	39 (20.00%)
E- News paper	21 (10.77%)
Chatting	64 (32.82%)
Find Information	33 (16.92%)
Others	11 (5.64%)

(N=195), Mean=32.5, Standard Deviation=18.21).

Easiness with SNs Platform while Accessing

Table-5 reveals the easiness of social networking platform while accessing it by the respondents during COVID-19 pandemic, which indicates that majority of the respondents i.e. 92 (47.18%) feels very easy to use it, whereas 48 (24.62%) of respondents feels moderately easy while accessing it, 54 (27.69%) are feeling easy and only 1 (0.51%) of respondents feels difficult to use this social networking platform for taking online classes etc.

Table 5: Easiness with SNs Platform while use during COVID-19 pandemic.

Easiness	Respondents
Very Easy	92 (47.18%)
Moderately Easy	48 (24.62%)
Easy	54 (27.69%)
Difficult	1 (0.51%)

(N=195), Mean= 48.75, Standard Deviation=37.32.

Problems/Barriers Faced by the Respondents

Table-6 presents the data about problems/barriers being face by the respondents while accessing social networking platform during COVID-19 pandemic, which indicates that majority of the respondents i.e. 68 (34.87%) facing slow internet/no network, whereas 45 (23.08%) of respondents facing non-clarity of teacher's voice during online classes, 37 (18.97%) of respondents experience the discharging the pone battery, whereas 28 (14.36%) of respondents face data limitation and 17 (8.72%) of respondents facing other problems like lack of time, availability of Smart Phone, health problems etc. during studying/learning.

Table 6: Problems/Barriers faced by the Respondents during COVID-19 pandemic.

Problems/Barriers	Respondents
Slow Internet/ No Network	68 (34.87%)
Non clarity of Voice	45 (23.08%)
Discharge of Phone Battery	37 (18.97%)
Data Limitation	28 (14.36%)
Others	17 (8.72%)

(N=195), Mean= 39, Standard Deviation=19.27.

Conclusion

At present the Social Networking Sites provide a very vital and easier platform to access the real time online classes during COVID-19 pandemic and share the relevant information for study/learning as well as enhancing the personal and professional relationship to each other. The above research indicates that the social networking sites are being use by the school students of senior secondary classes of Kendriya Vidyalaya Sangathan (Varanasi Region) for their day-to-day study/learning. The study reveals that Google-Meet platform is the most common and easy to use by the students for taking their online classes. Several features of these social networking platform such as presenting screen, chat box, raising hand, live audio and video, profile surfing, posting of new information, sharing notes, assignments, photo &

videos making friends, meeting new people and so on are the medium by which the students are experiencing real time class room feelings and to keep update and share their views to each others. Finally, I can conclude that social networking platforms are playing very crucial and important role in teaching learning process and minimizing the communication gap between the school, teachers and students and utilizing the time of students in a very fruitful way and connected them in one chain and so that they never feel isolated and neglected. It's a magic of social networking to connect the students under single umbrella effectively and efficiently for their future betterment during this very tuff time. anbut it can make more effective and efficient to maintain the free flow speed, privacy issues and removed the irrelevant information and IDs. The administration of school and educational Institutions should form a forum as well as provide maximum support for free flow communication.

Recommendations

1. The school management should provide high speed broad band connection and infrastructure to conduct online classes smoothly.
2. The school administration should spread wide awareness among students for fare and healthy use of social networking sites.
3. The libraries of Kendriyavidyalayas across the country should well equipped with all type of ICT infrastructure to promote the healthy and optimum use of SNS in teaching learning process.
4. Expertise should be sought for assistance in design and healthy use for these academic purposes.
5. A mechanism should be developed to block and remove the fake IDs and spam information displayed on social networking sites.
6. Privacy of individual's personal information should be given to the top priority.

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18

An Assessment of Faculty Members' Profiles at the National Institute of Technology, Rourkela, with Special Reference to the Indian Research Information Network System (IRINS)

Satyajit Nayak, Kunwar Singh, Somesh Rai & Dillip Kumar Parida

Abstract

The study presents the faculty members' profile of National Institute of Technology, Rourkela (NITRKL). The data was obtained from the Indian research information network system (IRINS) portal. The finding revealed that 2270 publications by top ten faculty members of National Institute of Technology, Rourkela. Dr Snehashish Chakraverty, Department of Mathematics has published 433(19.07%) publications and placed first rank followed by Prof Siba Sankar Mahapatra, Department of Mechanical Engineering has published 395(17.40%) publications and placed second rank. Prof Siba Sankar Mahapatra, Department of Mechanical Engineering received 12794 citations with 57 h-Index from Google Scholar placed at the first rank, followed by Prof Dayal Ramakrushna Parhi, Department of Mechanical Engineering received 6615 citations with 43 h-Index placed the second rank.

Keywords: *Citations, Crossref, Google Scholar, IRINS, INFLIBNET, NITRKL*

Introduction

The Information Network Library and Center (INFLIBNET) has developed the India Research Network Information System (IRINS), a web-based research information management (RIM) service. The IRINS portal allows researchers, academic organisations, faculty members, and scientists to easily collect, choose, and exhibit science communication efforts, as well as form a

scientific network. For R&D and academic enterprises in India, it is accessible as a free software as a service. Existing research management systems, such as human resource management systems, course management systems, grant management systems, institutional repositories, open and commercial citation databases, academic editors, and so on, will be supported by IRINS. To import academic publications from many sources, it has been integrated with different academic identities like Researcher ID, ORCID ID, Microsoft Academic ID, Scopus ID, and Google Scholar ID.

The National Institute of Technology, Rourkela (NITRKL) is one of India's most prestigious national institutes for technical education The Government of India has upgraded Rourkela's Regional Technical College to the status of a unique university, the National Institute of Technology, Rourkela. The main aim of the Institute is to produce high quality engineers and scientists at the undergraduate and graduate level in various fields of engineering and science. The National Institute of Technology (Rourkela) Society's Board of Governors governs the Institute, which has substantial administrative and financial autonomy. The Computer Science and Electronics streams as part of the World Bank's IMPACT project with the Swiss Development Corporation, have both contributed to the modernisation of the Institute. NIT Rourkela was ranked 20 with a score of 58.02 by the National Institutional Ranking Framework 2021 under the engineering category. A total of 378 faculty members with 9184 publications, 33 patents, 84590 crossref citations and 94156 citations have registered in the IRINS portal. Faculty profiles of the institute have been showcased using the IRINS portal with the initiative of Biju Patnaik Central Library.

Review of Literature

Tamizhchelvan & Anbalagan (2020) examined the profile of teachers at the Gandigram Rural Institute, which is considered a university, using the IRINS portal. The results showed that Professor P. Balasubramaniam from the Department of Mathematics has the highest number of publications (255) and the highest number of citations (5764). The Faculty of Chemistry also showed the largest number of articles (742) with citations (14306). On the other hand, similar study conducted by Tyagi (2020); Jeyapragash, Muthuraj & Kannan (2019); and Sab, Kumar & Biradar (2019).

Objectives of the Study"

1. To identify the top ten faculty members' publications;
2. To explore the top ten faculty citations and h-index;
3. To know the different types of documents of individual faculty; and

4. To analysis of h-index and Google Scholar citations from the top ten faculty members.

Methodology

The information was gathered for the present study from faculty profiles of the National Institute of Technology, Rourkela (https://nitrkl.irins.org). It is found that 2270 publications by top ten faculty members (data as on 23rd October 2021) have been collected from NITRKL faculty Profile Website. Collected data were analyzed using MS Excel with simple calculations.

Abbreviations: SSM (Prof Siba Sankar Mahapatra); DRP (Prof Dayal Ramakrushna Parhi); KPL (Dr Kunal Pal); KPR (Dr Krishna Pramanik); SCH (Dr Snehashish Chakraverty); RKP (Dr Raj Kishore Patel); SKP (Prof Subrata Kumar Panda); SSR (Prof Santanu Saha Ray); SDT (Prof Saurav Datta)
* For SSR (Prof Santanu Saha Ray) data updated from Google Scholar as it is not added to IRINS

Data Analysis and Interpretation

Top Ten Faculty Publications

Table 1 shows the top ten faculty publications. It is noticed that Dr. Snehashish Chakraverty, Dept. of Mathe. has published 395 (19.07%) publications have placed the 1st position succeeded by Prof. Siba Sankar Mahapatra, Department of Mechanical Engineering has published 395 (17.40%) publications and placed the 2nd position. It is moreover observed that Dr. Raj Kishore Patel, Dept. of Chemistry and Prof. Saurav Datta, Department of Mechanical Engineering both are poisoned the eight ranks with 150 (6.60%) publications each.

Table 1: Top ten faculty publications

S.N.	"Name of the Faculty"	"No. of Publications"	"%"	"Rank"
1	Prof Siba Sankar Mahapatra	395	17.40	2
2	Dr Snehashish Chakraverty	433	19.07	1
3	Prof Santanu Saha Ray	172	7.57	7
4	Dr Kunal Pal	198	8.72	5
5	Prof Dayal Ramakrushna Parhi	219	9.64	4
6	Prof Subrata Kumar Panda	175	7.70	6
7	Dr Raj Kishore Patel	150	6.60	8
8	Prof Bidyadhar Subudhi	239	10.52	3
9	Dr Krishna Pramanik	139	6.12	9

S.N.	"Name of the Faculty"	"No. of Publications"	"%"	"Rank"
10	Prof Saurav Datta	150	6.60	8
	Total	2270	100	

Top Ten Faculty Citations and H-index

Table 2 shows the top ten faculty citations and h-index. Prof. Siba Sankar Mahapatra, Department of Mechanical Engineering has received 4950 (14.84%) total citations and 4720 (16.69) citations from Crossref with 36 h-Index have placed 1st position succeeded by Prof. Bidyadhar Subudhi, Dept. of Electrical Engineering has received 4518 (13.54) total citations and 3650 (12.90%) citations from Crossref with 30 h-Index placed the second rank. Prof Saurav Datta, Department of Mechanical Engineering received 1757 (5.26) total citations and 1576 (5.57) citations from Crossref with 22 h-Index and placed the last rank.

Table 2: Top ten faculty citations and h-index as per IRINS instance

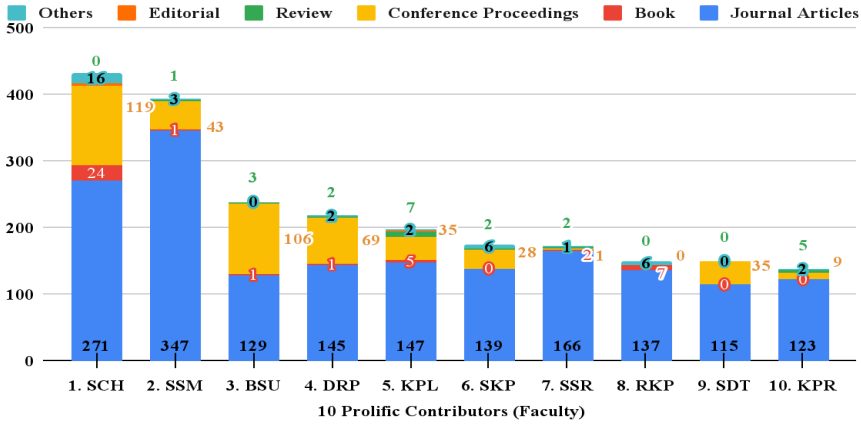
"S.N."	"Name of the Faculty"	"Total Citations"	"%"	"h-Index"	"Cross Ref Citations"	"%"	"Rank"
1	Prof. Siba Sankar Mahapatra	4950	14.84	36	4720	16.69	1
2	Dr. Snehashish Chakraverty	3378	10.12	30	2756	9.74	5
3	Prof. Santanu Saha Ray	2443	7.32	26	1992	7.04	8
4	Dr. Kunal Pal	3451	10.34	33	3208	11.34	4
5	Prof. Dayal Ramakrushna Parhi	2160	6.47	26	1723	6.09	9
6	Prof. Subrata Kumar Panda	3225	9.66	34	1892	6.69	7
7	Dr. Raj Kishore Patel	4191	12.56	36	3708	13.11	3
8	Prof. Bidyadhar Subudhi	4518	13.54	30	3650	12.90	2
9	Dr. Krishna Pramanik	3279	9.83	28	3048	10.78	6
10	Prof. Saurav Datta	1757	5.26	22	1576	5.57	10
	Total	33352	100		28273	100	

Various Types of Documents of Individual Faculty

Figure 1 indicates various types of documents of individual faculty. Prof Siba Sankar Mahapatra, Department of Mechanical Engineering has published 395 documents including Journal Articles (347), Books (1), Conference Proceedings (43), Review (1), Editorial (1) and others (3) have placed first,

followed by Dr Snehashish Chakraverty, Department of Mathematics has published Journal Articles (271), Book (24), Conference Proceedings (119), Editorial (3) and others (16) positioned second.

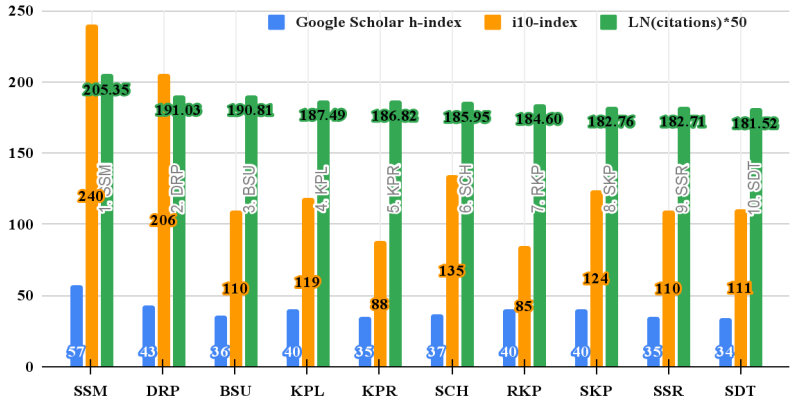
Figure 1: Various types of documents of Individual faculty



"Top Ten Faculty's Google Scholar Citations and H-index"

Figure 2 indicates the top ten faculty's Google Scholar Citations & h-index. Prof. Siba Sankar Mahapatra, Depart. of Mechanical Engineering received 12794 citations with 57 h-Index from Google Scholar placed the first rank, followed by Prof. Dayal Ramakrushna Parhi, Department of Mechanical Engineering received 6615 citations with 43 h-Index placed the second rank. Google Scholar profile of Prof. Santanu Saha Ray, Depart. of Mathematics is not linked to the IRINS database; so his citation data has been collected manually.

Figure 2: Top Ten Faculty's profile at Google Scholar



Conclusion

The Profile Management System is a very important tool for showcasing individual and institutional research to the public. The IRINS Profile Management System has been implemented at the National Institute of Technology, Rourkela, to display their research activities. It is found that the Department of Mechanical Engineering contributed more. Dr. Snehashish Chakraverty, Department of Mathematics and Prof. Siba Sankar Mahapatra, Department of Mechanical Engineering contributing the highest no. of papers. Therefore, this is counselled that the limited contributed department analyze further to enhance their research perceptibility.

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19

The Effective Role of Data Privacy of Social Media in Academic Libraries

Dr. Uma Pandey & Dr. Pankaj Mathur

Abstract

The present condition of privacy in social media and associated areas is captured in this study. I look at theoretical viewpoints and empirical discoveries on data and information privacy, categorizing them as privacy's function in social media, privacy psychological, and privacy economy. Although a cohesive collection of study themes provides a deep knowledge, theoretical and empirical studies reveal that this restricted emphasis has also confined our perspective of privacy to users in legal and ethical barriers. As a result, take an important step toward expanding the privacy domain across these borders, highlighting the attractive synergies that transcend different interests. Finally, suggested potential research areas that exemplify a multidimensional approach that integrates the numerous interlinked problems that emerge in modern privacy issues in social media. Because data privacy concerns affect consumers in a variety of unexpected ways, more work in this area is vital and required.

Keywords: *Academic Library, Social Media, Data Privacy*

Introduction

Academic Libraries

Library occupies an important role in the framework of the academic's system. It is not a mere store house of books, but is dynamic instrument of education. Without active support of a library, the whole academics functioning will come to a grinding halt. The basic role of a library is not only to fulfil the mission of the academic institution to which it belongs to but also

to advance its aims and objectives. It is a central place for study and research, to this end, the total functioning of the library has been geared. Library is fully computerized and connected with the internet. Stressing the role library plays in a university, The University grant committee (U.K.) in its report of 1921 mentions:

"The character and efficiency of a university may be gauged by treatment of its central organ the library. We regard the fullest provision for library maintenance as the primary and most vital need in the equipment of a university." (Parry: 1968:9). For research work, a library is as many essentials especially in the field of humanities and social sciences as the laboratory occupies in the experimental sciences, the functions of a library are:

1. Conservation of Knowledge and information.
2. Expansion of ideas and dissemination of knowledge

Academic libraries are increasingly utilising social media. This is part of a growing understanding that social media may help academics obtain information, explore possibilities, and share their experiences. Social media includes a variety of technology approaches such as blogs, micro blogging (e.g., Twitter), social networking (e.g., Facebook and Patients Like Me), video- and file-sharing sites (e.g., YouTube), e-games, and wikis.

Patients can utilise social media for a variety of purposes, including education, information, networking, support, goal-setting, and personal progress tracking. Social media, according to some doctors, can help patients with chronic diseases, cancer, rare diseases, maternal and new-born care, depression, wellness, preventive, and weight loss.

Patients gain from adopting social media for health reasons because the applications are designed with the patient in mind, allow for meaningful patient interaction, and empower the patient. Women are more likely than men to use social media to look for information about symptoms, treatments, diseases and conditions, and medication.(Househ et al., 2014)

Review Literature

Users of social media are sometimes concerned about how their postings and material are utilized in study. According to the findings, the researcher domain, content type, objective of data usage, and respondents' understanding of data collecting all have an influence on respondents' comfort. The replies of users can be used to identify sensitive data kinds and applications**.** (Gilbert et al., 2021)The phrases "social media" and "patient" were used to search the MEDLINE database. The search was done in September 2012, and 765 abstracts were found. According to the findings, such technology has the potential to improve patient involvement and empowerment. Before the technology can

reach its full potential, numerous obstacles must be addressed..(Househ et al., 2014)

Social media has become an important part of modern life, offering several benefits for social connection, economic development, and organizational success. As a result, libraries have tested with social media as marketing tools for their resources and services. Recently Harrison, Burress, Velasquez, and Schreiner (2017) examined the development of social media usage in academic libraries, describing how it progressed from a fringe activity to an essential communication tool. Many academics have assessed the efficacy of academic libraries' usage of social media. (Howard, Huber, Carter & Moore, 2018; Kim & Sin, 2016; Luo, Wang, &Han, 2013). Stvilia and Gibradze (2017) undergraduate student views of the usefulness of library social media postings were used to assess undergraduate objectives for academic library social media usage. Johnston (2014) The critical necessity of creating policies or guidelines for the execution of social media operations was addressed. Ramsey and Vecchione (2014) gave direction on establishing and implementing social media strategies, emphasizing their importance in any social media effort there is a wide range of case studies, how-to guides, and best practices guidelines accessible. Platform-specific examples include a LinkedIn partnership provided by Santiago, Vinson, Fisher, Lierman, and Warren (2017),

Twitter community formation by Young and Rossmann (2015), and utilizing Facebook to foster student ties by Phillips (2011). Peacemaker, Robinson, and Hurst (2016) drew illuminating linkages between best practices in public relations and academic library social media strategies and Brookbank (2015) provided advice on establishing social media strategy based on student comments There are also a number of unique social media campaigns and events, as well as promotional advice. Scavenger hunts are one of them. (McKee, 2017), a unique "catbrarian" campaign (Eastman, Saulnier, and Richardson, 2018), and post-event encouragements (Lafazan and Kiebler, 2017). These additions to the social media world served as a backdrop for the development of the SMDAL, and Harrison et al. (2017)'s phenomenological study persuaded SMDAL creators that a directory would be useful to both librarians coordinating social media and researchers researching the topic.

Academic libraries have a lot of promise when it comes to using social media to communicate and connect with their present and future audiences. According to recent Pew Research Centre polls, 88 percent of adults aged 18–29 and 95 percent of teenagers use some sort of social media platform; however, the range of platforms and usage habits are always changing (Anderson & Jian, 2018 and Smith & Anderson, 2018). An examination of the Pew research in further depth reveals the wide range of platforms utilised by these two age groups, demonstrating the need of academic libraries not only actively

adopting social media, but also responding to future changes in the social media landscape (Marks, 2019)

Methodology

The current assessment was based on a survey of the literature on academic library users' use of social media. Academicians' evaluations of social media initiatives were among the articles included in this review. Reviews, surveys, observational papers, and conceptual essays made up the rest of the articles. Articles were included if they discussed how academic library users use social media.

Academic Interest in using social media:

1. **Scholarly Communication:** Explained the word and how it might be defined in professional work, with a focus on research and publication.
2. **Academic Profiles:** Investigated tools for developing a profile, such as Google Scholar, Academia.ca, Research Gate, and Mendeley.
3. **Online Content Information:** This subject addressed how to use videos, pictures, and web resources in classroom activities; copyright, open education resources, and open access were also discussed.
4. **Teaching Tools:** Displayed tools of interest to college teachers, as well as material supplied by other departments such as Learning Technology and the Instructional Learning and Development Centre (workshops and sessions). Interest Across the Board.
5. **Professional Development of Employees:** Promoted opportunities and events such as Indigenous seminars and shared employee accomplishments.
6. **Discover Our Library:** Highlighted databases, resources, and library services.
7. **Book Suggestions:** Staff recommendations, encouraging a shared community (Verishagen & Maddison, 2020.)

Advantage of Using Social Media in Academic Libraries

As university libraries adapt to meet the changing requirements of students in the digital era, the emphasis has changed away from the physical book collection and toward a package of services that includes advances in education, technology, and social media, among other things.

Participants in the survey expressed worry about online and patron privacy, but their lack of understanding of local processes and rules suggests a possible need for improved privacy education. Commentary This study adds a Canadian viewpoint to the corpus of attitudinal studies on university librarians

and online privacy issues, thereby broadening international perspectives in this field. The topic of privacy and libraries is complicated, and it is included in numerous professional library organization declarations at the worldwide level.

Drawbacks of Using Social Media

According to the World Health Organization, suicide is one of the top ten causes of death. Every suicide death affects an estimated 138 people's lives, and virtually every other statistic about suicide fatalities is as concerning. Because of the pervasiveness of social media and the near-ubiquity of mobile devices used to access social media networks, new forms of data are available. For comprehending the behaviour of people who (try to) commit suicide and suggesting new avenues for preventative intervention

We show how social media data may be used to identify people who are suicidal. We use natural language processing and machine learning (specifically deep learning) techniques to detect quantifiable signals surrounding suicide attempts, and we describe designs for an automated system for estimating suicide risk that can be used by people who do not have specialized mental health training (eg, a primary care doctor).

We also look at the ethical issues of such technology and the consequences for privacy. This technique is currently only utilized for intervention for those who have "opted in" for the analysis and intervention, but it enables scalable screening for suicide risk, possibly detecting many people who are at risk preventively and prior to any involvement with a health care system. This presents a huge cultural dilemma about the trade-off between privacy and prevention—we have potentially life-saving technology that is now reaching just a fraction of the potential individuals at risk due to privacy concerns. Is the present trade-off between privacy and security sustainable?

We have exhibited cutting-edge findings for detecting persons at risk of suicide using an automated assessment of language posted on social media. These findings are the outcome of what we believe to be a basic component of a new type of screening system, which has been widely discussed in the crisis prevention community but has yet to be implemented. These machine learning methods are accurate enough to be useful in the envisioned screening system, but the remaining components of the system are not yet ready for deployment.

We investigated the ethical and privacy concerns surrounding the use of these algorithms for screening and monitoring, concluding that while there are novel ways to consider using information from these algorithms to aid intervention, the general public has expressed opposition to similar approaches. Although it is theoretically conceivable to construct an intervention system

based on algorithmic screening, the cultural implications of implementation are far from established. We hope that this serves as a catalyst for discussion on the implications for culture and society. (Coppersmith et al., 2018)as assessed by the World Health Organization. For every death by suicide, an estimated 138 people's lives are meaningfully affected, and almost any other statistic around suicide deaths is equally alarming. The pervasiveness of social media—and the near-ubiquity of mobile devices used to access social media networks—offers new types of data for understanding the behavior of those who (attempt to

The study suggests that patients' usage of social media has a bright future; nevertheless, data on efficacy and safety is lacking. Social media's efficacy is currently restricted. Various difficulties have also been noted in relation to Concerns about privacy and security, usability, identity manipulation, and disinformation the usage of social media for people seeking health information, media technology is an increasing trend. According to the findings, such technology has the potential to improve patient involvement, empowerment, and community development. Social media has a future in healthcare, particularly in terms of patient involvement and empowerment; nevertheless, numerous obstacles must be addressed before the technology can reach its full potential.(Househ et al., 2014)

Although research employing online datasets from social media platforms is becoming more popular, new study indicates that platform users are sometimes unhappy with how their posts and material are used in research projects. While earlier research has shown that a number of contextual elements may impact this discomfort, such variables have yet to be separated and compared. We describe the findings of a factorial vignette survey of American Facebook users in this paper. The findings show that researcher domain, content type, goal of data use, and awareness of data collection all influence respondents' comfort (as evaluated by acceptability and concern assessments) with various data uses. We advise researchers and ethical review boards on how user reactions to study uses of their data may be used to identify sensitive data types and uses.(Gilbert et al., 2021) The goal of this article is to identify emerging roles and responsibilities for academic librarians with the potential to better integrate the library into the research process. The authors worked with researchers in the United States and Europe to investigate, create, revise, and decipher scholarly profiles in a variety of software applications in addition to learning how to enhance the reputation online and search capabilities of personal faculty members as well as their affiliated organizations.

To understand and manage scholarly social media, including new, alternative metrics, the authors evaluated and classified the major academic profile platforms, noting the overlapping characteristics, benefits, and drawbacks of each. Given the variety of underlying concerns, which are also discussed in depth in the article, the agreement is that maintaining

one's profile updated and proper on all of these platforms would be time-consuming.

However, it was demonstrated that a researcher's refusal to join in scholarly social media might lead to a misrepresentation of his or her academic achievements, which can have unexpected consequences. Academic librarians' existing abilities and competencies may assure an essential role in the research workflow by monitoring and maintaining researcher profiles on scholarly social media in order to successfully represent their institutes' scholarship. (Ward & Bejarano, 2015)

Social Media Role for Academic Libraries

The advancement of social media in academic libraries is a tool for achieving the libraries' goals, particularly in terms of facilities and services. Furthermore, academic librarians have been utilizing social media as a primary channel for marketing, communication, and cooperation. However, social media use in academic libraries is not without criticism, particularly in poor nations.

The purpose of this review is to highlight the benefits and drawbacks of social media involvement for academic libraries in developing nations. The review was carried out utilizing the techniques established by the Centre for Reviews and Disseminations. For the review, several internet databases were examined. This review found 50 items helpful.The literature's reports on the benefits and drawbacks of social media participation might help practical librarians who are thinking about implementing social media. Furthermore, this research will help Library and Information Science (LIS) scholars identify areas of need for future research.(Magoi et al., 2019)

Conclusion

Use of social media as a study aid, particularly Facebook®, is becoming increasingly essential in health professional education programs. However, data on the overall view of Facebook® as a student-driven e-learning tool among students is scarce. By assessing undergraduate students' informal usage of Facebook® and their attitude about utilizing Facebook® in professional education, this study intended to assist educators understand how and why students use Facebook® for academic reasons. According to the results of this study, students often and extensively use Facebook® as an unofficial medium for communication, teaching, and learning. Facebook® might be an excellent option in educational settings that lack official e-learning platforms. Students should make every effort to develop a suitable learning environment on Facebook® that will benefit students' academic performance. Before formally introducing Facebook® and other social media platforms inside the academic environment, interventions to enhance attitudes toward social media e-professionalism should be in place.(Subeh et al., 2018)

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20

Scientific Research Publications on Global Warming: A Scientometric Analysis Based on the Web of Science

Md Safiqur Rahaman & Mr. Yougal Joshi

Abstract

Purpose: *The greenhouse effect, which is produced by higher amounts of carbon dioxide, CFCs, and other pollutants, is typically ascribed to a steady increase in the total temperature of the earth's atmosphere is called global warming. This study aims to analyze the research productivity of global warming between 2011 and 2020 based on bibliometrics.*

Methodology: *Bibliometric method has been applied to analyze the research output of global warming research publications. A total of 3858 papers have been downloaded from the web of science database and analyzed focused bibliometrics indices, namely annual growth, productive country and organization, prolific author and their pattern of authorship, type of research, most cited reference and research paper, most impactful source, and the theme of research in global warming. The research data have been analyzed through Bibexcel, Biblioshiny, and VOSviewer.*

Results: *The analysis shows a significant growth of literature since 2013, and it was highest in 2020 (522 papers). Articles (74%) were the primary form of research on global warming. The "Journal of climate" (NP=116) was the most relevant source in global warming publications. Zhang X was the most prolific author in the field. The USA was the most cited as well as the most productive country. The research paper entitled "Increasing drought under global warming in observations and models" (TC=1876) was the most cited publication, and the USA and China (NP=173) were the most collaborative in the country in*

global warming research. This bibliometric assessment can provide direction to researchers, funding organizations, policymakers, and environmentalists.

Keywords: *Global warming, Scientometric, Relative growth rate, Doubling time, prolific Author, Source impact, country collaboration*

Introduction

The concept of global warming is a burning issue for Environmental Scientists. Global warming is the abnormally rapid increase in the earth's average surface temperature over the past century, primarily due to the greenhouse gases released by burning petroleum products (Holli Riebeek, 2020). The Kyoto Protocol determined six primary ozone-depleting substances that significantly impact the environment: Namely CO2 (carbon dioxide), CH4 (Methane), N2O (nitrous oxide), HFCs (hydrofluorocarbons), PFCs (perfluorocarbons), and SF6 (sulfur hexafluoride). Among them, carbon dioxide has been thought of as the most noticeable supporter of global warming (Abeydeera et al., 2019). We see numerous common catastrophes in India and throughout the world. It has had a significant effect on individuals' day-to-day lives and creates issues for policymakers and environmental scientists. Our world's surface is turning out to be more sweltering day by day because of the catching of sunlight and an alarming rise in the level of carbon dioxide. This will thus prompt environmental change and ascend in the ocean level. It influences the health of living creatures on earth. So, the researchers are centering here to conquer the future problem of global warming. Scientometric assessment of scientific output is an essential tool to realize the research publication pattern. So, it will be helpful for an environmental scientist to develop a scientific policy to control global warming.

Tague-Sutcliffe defines Scientometrics as "studying the quantitative aspects of science as a discipline or economic activity. It is part of the sociology of science and has application to science policymaking. It involves quantitative studies of scientific activities, including, among others, publication, and so overlaps bibliometrics to some extent" (Tague-Sutcliffe, 1992). The current study focused on the growth of literature on global warming over the study period, document-wise research publications, impact journal, impact authors, the pattern of authorship, highly productive countries, country collaboration, etc.

Review of Related Literature

McGlade & Ekins had analyzed limiting global warming below 2 degrees Celsius when the geographic distribution of underutilized fossil resources was unused. Policymakers have generally agreed that the average global temperature rise should not exceed 2 degrees C. But present estimates of global

fossil-fuel reserves are around three times higher than this. Findings suggest a third of oil reserves, half of the gas reserves, and over 80 percent suggest a third of oil reserves, half of the gas reserves, and over 80 percent of current coal reserves should remain unused from 2010 to 2050 to meet the target of 2-degree c (McGlade & Ekins, 2015). Hughes et al. have investigated global warming mass bleaching of corals. The study found that record temperatures produced pan-tropical coral bleaching in 2015-2016. It was the third global-scale occurrence since mass bleaching was first reported in the 1980s. The researchers found local reef protection provides little or no resilience to severe heat. They say immediate worldwide action is required to ensure the survival of coral reefs (Hughes et al., 2011). Root et al. have studied global warming on wild animals and plants. The global average temperature has risen by 0.6 degrees Celsius in the last 100 years. More than 80% of species that show alterations are shifting in the expected direction based on known physiological restrictions. The study looked at 143 studies on species and global warming across 143 different taxa (Root et al., 2003). Vicente-Serrano et al. studied the standardized precipitation evapotranspiration index (SPEI) based on precipitation and temperature data. It has the advantage of combining multiscalar characters to include the effects of temperature variability on drought assessment. In addition, the SPIE can be compared to the self-calibrated Palmer drought severity index (sc-PDSI)(Vicente-Serrano et al., 2010). Cox, Peter has examined global warming due to carbon dioxide emissions from humans are predicted to lead to significant changes in climate. The terrestrial biosphere acts as an overall carbon sink until about 2050 but turns into a source. By 2100, atmospheric CO2 concentrations are 250 p.m.v. higher in our fully coupled simulation than in uncoupled models (Cox et al., 2000). Sangam & Savitha have research gives a methodological approach study that focuses on a scientific approach to climate change and global warming literature from the Web of Science database from 2001 to 2016. The study looked at growth trends, authorship patterns, collaborative index, collaborative co-efficient, degree of collaboration, division of forms, most favored authors, country-wise distribution, and other factors. Year after year, the number of publications has increased, while single-authored contributions have declined, and multiple-authored contributions have increased. Both the number of multi-author collaborations and the efficiency of those collaborations have improved. From 2001 to 2016, the relative growth rate of climate change publications production increased gradually; the doubling time for Climate change between 2001 and 2016 is 0.98 and 4.36, respectively (Sangam & Savitha, 2019). Al Attas et al. have conducted a scientometric analysis of big data research in Saudi Arabia during 2015-2019. Scopus data have been used to analyze the research trends during the study period. The study includes the top producing organization, authors, international collaboration, and subject-wise publications, etc. The results show that 2019 has the highest research on

big data, and the Journal of IEE access was the most relevant source in the field. The research also reveals that researchers preferred to publish their papers in article form (Al-attas et al., 2021). Wuni, Shen, & Osei-Kyei have explored global research productivity on green building from 1992 to 2018. The study analyzed a total of 1147 research articles Study from 1992 to 2018. It revealed that research on green building was increased exponentially from 1992 to 2018. It also found that 44% of countries are highly engaged in the research activity on green buildings, a major ten broad themes on the green building identified and suggested for future research. Finally, this paper provides new insight into the modern researcher, funding agencies, policymakers, and other professionals about the research progress in the field of green buildings (Wuni et al., 2019). Jelvehgaran Esfahani, Tavasoli, & Jabbarzadeh have studied the role of big data on social media. The study is based on a scientometric analysis of big data in social media from 2012 to 2019. The study collected data from the Scopus database for analyzing the research paper of big data roles in social media. The study explored that the growth of research literature has grown exponentially over time. The decision support system keyword has maximum network densities followed by heuristics methods. The USA has received the maximum number of citations (7548), followed by the UK (588), while China received 543 Citations. The study showed that big data analytics and twitter are crucial topics (Jelvehgaran Esfahani et al., 2019). B. M. Gupta & Dhawan conducted a scientometric analysis of global machine translation of research published during the year (2007-2016) based research paper indexed in the Scopus database. The study analyses different global machine translation research publications based on quantitative and qualitative measures such as year-wise publication growth, citation impact, global share, international collaboration, top contributing countries, and organization. It also revealed the topmost contributing authors in the field of machine translation publications. It also explored that highly cited paper in global machine translation (Gupta & Dhawan, 2019). Fang, Yin, & Wu have described the research performance in Climate Change and Tourism from 1990 to 2015. The study collected 1976 research publications from 1990-2015 in Climate change and Tourism Using CiteSpace analyzing software. Study visualized Collaboration network, Co-Citation Network, and recent emerging trends. It was found in the study that the number of research publications has increased exponentially, and it became an interdisciplinary subject. The highly productive authors and institutions belong to Australia, the United States of America, Canada, New Zeeland, and European countries. The study discovers intriguing issues of Climate Change and Tourism are Consequences of environmental change for the travel industry, fundamental adjustments, the helplessness of the travel industry, visitor conduct, request because of ecological change, and emanation decreases in the travel industry.

The paper featured top to bottom examination of environmental change, and the travel industry investigates action for understanding worldwide patterns and bearings in this field over the most recent 25 years (Fang et al., 2018). Sadik, Batcha has determined the research productivity of the top six universities of Tamil Nadu from 2000 to 2017. The study examined different Scientometric parameters of the publications published by all six universities of Tamil Nadu. The study included research trends, growth of literature, and collaboration pattern of published literature of the top six universities of Tamil Nadu. The study found out that the average growth rate of literature increased at 9.76%, average citation per paper is 12.18%, United States of America and South Korea is the leading international collaborating countries, the compound average growth rate of all the Six universities is 9.76. It was also showed that most of the research publications are from Chemistry, Crystallography, and Pharmacy (Sadik Batcha, 2018). M. K. Singh has reviewed the growth trends in authorship pattern and collaboration of authors in biotechnology during the year 2001 to 2016. A total of 18918 articles have been downloaded from the Scopus database and analyzed using 5 Scientometric parameters such as Collaboration coefficient, Authorship pattern, Activity Index, RGR, and DT. The average number of authors per paper accounted for India with 4.92, collaboration coefficient of India during the 16 years is 0.63, multi-authorship articles are dominant as compared to single authorship, and the RGR over the 16 years is decreasing while doubling time is increasing gradually, a researcher in the field of biotechnology are depends on collaborative research rather than solo research, the maximum activity Index year is 2016 (180.3) while the minimum AI in 2001 with (42.38) and the United States of America is the most preferred Country for International collaboration pattern of India (Singh, 2017). Kalantari et al. have examined the global research trends in big data from 1980 to 19th March 2015. Six thousand five hundred seventy-two papers have been retrieved from the web of science database and analyzed with the help of bibliometric tools. The bibliographic data are taken only from the subject category of computer science and analyzed using Microsoft Excel version 2013 for general concentration, dispersion, movement of the pool of the data from papers. The study used a t-test and ANOVA test that proved the hypothesis. A detailed analysis focused on types of document, language-wise distribution of the publication, yearly distribution of the publication, the country-wise contribution of publications, analyzed research area and journals, analysis of web of science categories, authors analysis, and analysis of author keyword (Kalantari et al., 2017).

Objectives

1. To know annual global research growth on global warming between 2011 and 2020.

2. To find out the relative growth rate and doubling of global warming publications.
3. To explore document-wise research publication in global warming.
4. To know the pattern of authorship and prolific author on global warming.
5. To find out the most productive institution and country on global warming publications.
6. To know the most impactful journal on global warming.
7. To find out the most cited articles in the field of global warming.
8. To know the most used author keywords on global warming.
9. To find out the collaboration in terms of the author and international level.
10. To explore the research theme on global warming research.

Methodology

The scientometric method was applied to explore global warming research publications between 2011 and 2020. The Scientometric approach is a study of quantitative means of investigating scholarly work publishing practices, publishing trends, and topics under investigation. Therefore, this study applies the scientometric method in global warming literature. Scopus database is one of the most extensive peer-reviewed indexing and abstracting databases of literature. The required data were collected at King Fahd University of petroleum and minerals, Dhahran, Saudi Arabia, on February 11, 2021. The target data searched in the advanced search box by selecting field tags (Title). The following search query is involved in the Scopus database. "TITLE (global AND warming) AND (LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2015) OR LIMIT-TO (PUBYEAR, 2014) OR LIMIT-TO (PUBYEAR, 2013) OR LIMIT-TO (PUBYEAR, 2012) OR LIMIT-TO (PUBYEAR, 2011))". A total of 3,858 publications have been downloaded in RIS, CSV, and BibText format, analyzed with Scientometric software Bibexcel, Biblioshiny, and VOSviewer.

Limitation of the Study

The present study entitled "**Global research publications on global warming: A scientometric analysis based on the web of science**" is to find out global research output on global warming during the study period of 2011 to 2020. This study includes only the last 10-year global research publication of global warming.

Result and Discussion:

The primary information of the global warming data reveals that there were 3858 publications during 2011-2020. A total of 10192 authors contributed to 1544 sources, 167592 references have been consulted, the average years from publication was 5.15 with average citations per document was 20.9. A total of 13461 keywords plus and 7469 Author's Keywords have appeared in 3858 research publications. A total of 793 single-author documents were found in the analysis of global warming publications. The analysis also reveals the Documents per Author (0.379) and authors per document (2.64). The table also showed that Co-Authors per Documents (3.79) and Collaboration Index (3.11). For more information about global warming publications' main information, refer to table (1).

Table 1: A primary information of global warming data:

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2011:2020
Sources (Journals, Books, etc)	1544
Documents	3858
Average years from publication	5.15
Average citations per document	20.9
Average citations per year per doc	3.039
References	167592
DOCUMENT CONTENTS	
Keywords Plus (ID)	13461
Author's Keywords (DE)	7469
AUTHORS	
Authors	10192
Author Appearances	14628
Authors of single-authored documents	652
Authors of multi-authored documents	9540
AUTHORS COLLABORATION	
Single-authored documents	793
Documents per Author	0.379
Authors per Document	2.64
Co-Authors per Documents	3.79
Collaboration Index	3.11

Yearly Research Growth in Global Warming

Table (2) shows a fluctuation in research growth on global warming during the last ten years during 2011-2020. The highest research recorded in 2020 (np=522), followed by 2019 (np=467), 2018 (np=441) and 2017 (np=385). The year 2015 (np=309) produced minimum research during the last ten years. It was clear from the table that every year produced more than 300 research on global warming. The table also depicts that the mean total citation per article was highest in the year 2011 (40.39), followed by 2013 (40.10) and 2015 (30.08). While mean total citations per year were highest in 2013 and 2015 (5.01) each, followed by 2011 and 2014 (4.04), respectively.

Table 2: Research growth during 2011-2020

Year	NP	Mean TC per Art	Mean TC per Year	Citable Years
2011	362	40.39	4.04	10
2012	382	28.37	3.15	9
2013	338	40.10	5.01	8
2014	336	28.28	4.04	7
2015	309	30.08	5.01	6
2016	316	20.04	4.01	5
2017	385	18.67	4.67	4
2018	441	12.23	4.08	3
2019	467	6.59	3.30	2
2020	522	1.63	1.63	1

Relative Growth Rate and Doubling Time

The relative growth rate concept was first given by (Mahapatra 1985) in the year 1985. Table (3) illustrated the relative growth rate and doubling time of research growth of global warming during 2011-2020. It shows in the table that the relative growth rate was consistently decreasing from 2012(RGR=0.72 to 2020 (RGR=015). At the same time, the doubling time was regularly increasing over time. It was the lowest 0.96 DT in 2012 and highest in 2020 (DT=4.77). Thus, the table clearly shows the relative growth rate and doubling time reversal with each other.

Table 3: Relative growth rate and doubling time

Year	Articles	Cumulative	Log1	Log2	RGR	DT
2011	362	362	0.00	5.89	0.00	0.00
2012	382	744	5.89	6.61	0.72	0.96
2013	338	1082	6.61	6.99	0.37	1.85

Year	Articles	Cumulative	Log1	Log2	RGR	DT
2014	336	1418	6.99	7.26	0.27	2.56
2015	309	1727	7.26	7.45	0.20	3.52
2016	316	2043	7.45	7.62	0.17	4.12
2017	385	2428	7.62	7.79	0.17	4.01
2018	441	2869	7.79	7.96	0.17	4.15
2019	467	3336	7.96	8.11	0.15	4.60
2020	522	3858	8.11	8.26	0.15	4.77

Type of Documents

Figure (1) shows that type of research produces in global warming during 2011-2020. Out of 3858 papers on global warming, 2862 (74%) research is in the form of articles, a similar type of analysis was reported by Rahaman et al. (2021), followed by 278 conference papers (7%), 210 book chapters (6%), 199 reviews (5%), and 86 notes (2%). Less than 5% of research on global warming includes in the form of editorial, erratum, letter, book, short survey, conference review, abstract report, business article and retracted.

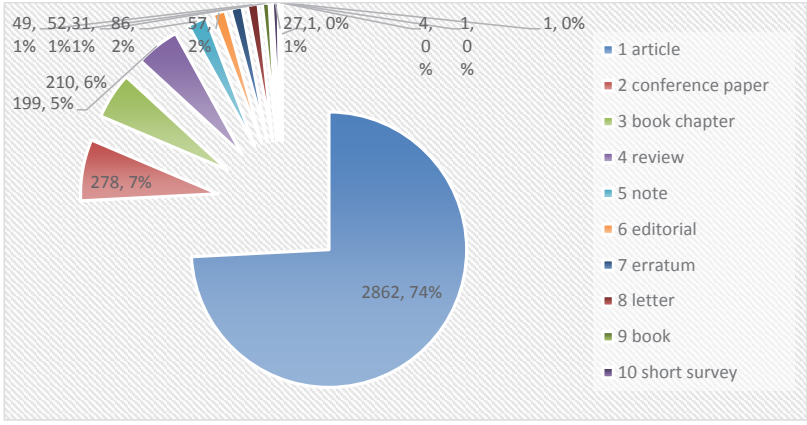


Figure 1: Type of research on global warming

Most Impactful Journal

Table (4) represent the top 10 research source that produced literature on global warming. All the top then sources combined made 655 research papers on global warming. Six journals contributed more than 50 papers, and only one journal contributed more than 100 papers. Coincidently all the top then journals belong from the quartile 1 (Q1) category. Most of the journals originated from

the UK, the USA, and the only journal belongs from the Netherland (Journal of Climatic change). Journal of climate surfaced as highest contributed journals (NP=116), followed by Climate dynamics (NP=93), Geophysical research letters (NP=83), Environmental research letters (NP=80), and Climatic change (NP=58). Among the top ten journals, *Nature* has the highest Journal impact factor (JIF=42.77), followed by *Nature climate change* (JIF=20.89), journal of climate (JIF=7.70), and journal of cleaner production (JIF=7.24). In terms of total citations, *Nature climate change* received the highest number of total cation (TC=8015) for producing 47 research papers on global warming, followed by Nature got 6112 total citations for 37 articles, journal of climate have 3859 total citations for 116 articles. The analysis reveals that research in global warming has a greater chance of publishing in a high impactful journal with a decent quartile category.

Table 4: Top 10 journals in global warming

Rank	Source	Country	Publisher	NP	TC	JIF	Q	h_ index	g_ index	m_ index	PY_ start
1	Journal of climate	USA	Amer Met. Soc	116	3859	7.70	Q1	33	58	3.00	2011
2	Climate dynamics	USA	Springer	93	2105	4.48	Q1	25	42	2.27	2011
3	Geophysical research letters	USA	Amer Geophysical	83	2436	4.49	Q1	28	47	2.55	2011
4	Environmental research letters	UK	Iop Publishing	80	2728	6.09	Q1	24	51	2.18	2011
5	Climatic change	Netherland	Springer	58	1690	4.13	Q1	21	40	1.91	2011
6	Scientific reports	UK	Nature Pub	50	975	3.99	Q1	18	29	2.25	2014
7	Journal of cleaner production	USA	Elsevier	49	1234	7.24	Q1	21	33	2.10	2012
8	Nature climate change	UK	Nature Pub	47	8015	20.89	Q1	36	47	3.60	2012
9	Global change biology	UK	Blackwell Sc	42	2062	3.01	Q1	25	42	2.27	2011
10	Nature	UK	Nature Publ	37	6112	42.77	Q1	20	37	1.82	2011

Prolific Author

Table (5) demonstrates a list of productive authors in global warming publications. The Author, Zhang X, affiliated with the Center for Ocean and Climate Research, China, has 30 papers with 732 total citations, followed by Wang Y, affiliated with Changzhi Meteorological Administration, china, has 27 paper for 238 TC, Xie SP affiliated with University of California 27 paper for 1885 TC, Li Y, and Wang X have an equal number of documents (NP=22) for

435, 459 total citations respectively. The table records the top global warming authors with at least 16 papers with 238 total citations between 2011 and 2020. Huang P (NP=17, TC=420) and Chen J (NP=16, TC=333) are on the base list in the table. The table reveals that most authors belong from China and the USA, so there is a greater chance of having more global warming research in the other part of the world.

Table 5: Top 10 most productive authors in global warming

Rank	Author	Affiliations	Country	NP	TC	h_ index	g_ index	m_ index	PY_ start
1	Zhang X	Center for Ocean and Climate Research	China	30	732	16	27	1.6	2012
2	Wang Y	Changzhi Meteorological Administration	China	27	238	10	14	1	2012
3	Xie SP	University of California	USA	26	1885	15	26	1.36	2011
4	Li Y	China University of Geosciences	China	22	435	10	20	0.90	2011
5	Wang X	Chinese Academy of Sciences	China	22	459	11	21	1	2011
6	Liu Y	University of California	USA	21	412	10	20	1	2012
7	Zhang L	Chinese Academy of Sciences	China	20	635	10	20	0.90	2011
8	Leiserowitz A	Yale University	USA	18	1105	13	18	1.18	2011
9	Huang P	Chinese Academy of Sciences	China	17	420	9	17	1	2013
10	Chen J	Hohai University	China	16	333	9	16	0.81	2011

Pattern of Authorship

Figure (2) analyze the authorship pattern in global warming. It reveals that author patterns range from a single authorship to fifty-seventh authorship. The top five authorship patterns were single authorship (NP=793), two authorship (NP=725), three authorship (NP=688), four authorship (565), and fifth authorship (NP=378). The analysis shows that single authorship is more prominent in global warming research, and there is the chance of publishing more collaborative research. The authorship and number of publications are inversely proportional to global warming publications during 2011-2020. The figure list the bottom authorship was 50, 53, 54, and 57 with only a single publication.

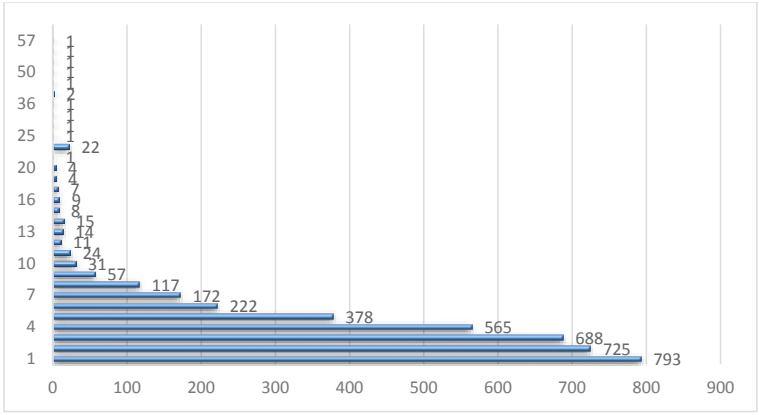


Figure 2: Authorship pattern

Productive Country in Global Warming

Table (6) illustrated the top ten most productive countries in global warming research output. The top productive country, along with their total citation, the USA was the highest contributed country (NP=1860, TC=23557), followed by China ((NP=1746, TC=8653), the UK ((NP=568, TC=4349), Germany ((NP=510, TC=3341) and Japan ((NP=495, TC=1531). Canada and Spain were at the bottom of the list with 2378, 1916 total citations, respectively. India contributed 320 research papers on global warming with 1699 total cations.

Table 6: Productive Country

Rank	Country	NP	TC	TC rank
1	USA	1860	23557	1
2	China	1746	8653	2
3	UK	568	4349	4
4	Germany	510	3341	5
5	Japan	495	1531	10
6	Australia	422	5457	3
7	India	320	1699	9
8	France	299	2607	6
9	Italy	250	1611	9
10	Canada	248	2378	7
11	Spain	248	1916	8

Productive Institutions

Table (6) list the top ten most active research institution in global warming. The University of California, USA was the most contributed institution in global warming publication (NP=123), followed by Nanjing university of information science and technology, China (NP=117), Institute of atmospheric physics, China (NP=115), University of Chinese academy of sciences, China (NP=83) and Yale University (NP=48). National climate center was at the bottom of the list, contributed 41 papers. The table reveals that three countries, namely the USA, China, and the UK, are actively involved in global warming research. Hence, there is a huge opportunity for other institutions to have published research in the area.

Table 7: Top 10 productive institutions:

Rank	Affiliations	Country	NP
1	University of California	USA	123
2	Nanjing university of information science and technology	China	117
3	Institute of atmospheric physics	China	115
4	University of Chinese academy of sciences	China	83
5	Yale university	USA	48
6	National center for atmospheric research	USA	46
7	Chinese academy of sciences	China	45
8	Beijing normal university	China	44
9	University of oxford	UK	43
10	National climate center	China	41

Most Global Cited Documents in Global Warming

Table (8) list the top ten most-cited research papers on global warming. The top two most cited research paper written by Dai A have received the highest citations, "Increasing drought under global warming in observations and models" (Dai, 2013) (TC=1876) and "Drought under global warming: a review"(Dai, 2011) (TC=1619), followed by "Global warming and changes in Drought" (Trenberth et al., 2014) by Trenberth K (TC=1101), "Global warming and recurrent mass bleaching of corals" (Hughes et al., 2011) by Hughes TP (TC=1072) and "The Politicization of Climate Change and Polarization in the American Public's Views of Global Warming, 2001–2010" (Mccright & Dunlap, 2011) by McCright AM (TC=1013). The title "The challenge to keep global warming below 2 °C"(Peters et al., 2013 by Peters GP was the bottom of the list (TC=607). The table also reveals that most of the cited research paper has appeared in the *Nature* journal.

Table 8: Top 10 Global cited papers in global warming

Rank	Title	Author	Year	Source	TC	TC per Year	Normalized TC
1	Increasing drought under global warming in observations and models (Dai, 2013)	Dai A	2013	Nat Clim Change-A	1876	208.44	46.78
2	Drought under global warming: a review (Dai, 2011)	Dai A	2011	Wiley Interdiscip Rev Clim Change	1619	147.18	40.08
3	Global warming and changes in drought (Trenberth et al., 2014)	Trenberth K	2014	Nat Clim Change	1101	137.62	38.93
4	Global warming and recurrent mass bleaching of corals (Hughes et al., 2011)	Hughes TP	2011	Nature	1072	214.4	57.40
5	The Politicization of Climate Change and Polarization in the American Public's Views of Global Warming, 2001–2010 (Mccright & Dunlap, 2011)	McCright AM	2011	Sociol Q	1013	92.09	25.08
6	Recent global-warming hiatus tied to equatorial Pacific surface cooling (Kosaka & Xie, 2013)	Kosaka Y	2013	Nature	953	105.88	23.76
7	The geographical distribution of fossil fuels unused when limiting global warming to 2 °C (McGlade & Ekins, 2015)	Mcglade C	2015	Nature	732	104.57	24.33
8	Projecting Coral Reef Futures Under Global Warming and Ocean Acidification (Dai, 2013)	Pandolfi JM	2011	Science	690	62.72	17.08
9	Global warming preceded by increasing carbon dioxide concentrations during the last deglaciation (Shakun et al., 2012)	Shakun JD	2012	Nature	631	63.1	22.24
10	The challenge to keep global warming below 2 °C (Peters et al., 2013)	Peters GP	2013	Nat Clim Change	607	67.44	15.13

Thematic Map of Title

Figure (3) analyze the thematic map of title keywords during 2011-2020 for global warming publications. This map has been generated through Biblioshiny software. Minimum 43 keywords plus were considered for analysis. The Figure reveals four themes, all themes represented by four clusters.

The theme of Cluster 1 is global warming climate: This cluster comprises 33 title keywords**,** namely global, warming, climate, change, impact, effects, model, impacts, study, effect, future, de, responses, environmental, regional, extreme, implications, mitigation, species, potentials, thermal, science, anthropogenic, influence, modeling, river, extremes, scenarios, northern, risk, review, marine, and adaptation.

The theme of Cluster 2 is known as response temperature tropical. This cluster represented 29 keywords such as response, temperature, tropical, ocean, precipitation, sea, pacific, surface, north, due, hiatus, models, atmospheric, role, variability, monsoon, recent, summer, cmip, level, air, induced, south, Indian, projected, rainfall, circulation, Asia, and east.

The theme of cluster 3 is potential China low. This cluster has 17 keywords: potential, China, low, carbon, heat, greenhouse, emissions, rice, gas, system, systems, soil, management, net, term, intensity, and performance.

The theme of cluster 4 is energy analysis water, and it consists of 11 keywords: energy, analysis, water, based, assessment, production, cycle, life, time, land, and approach.

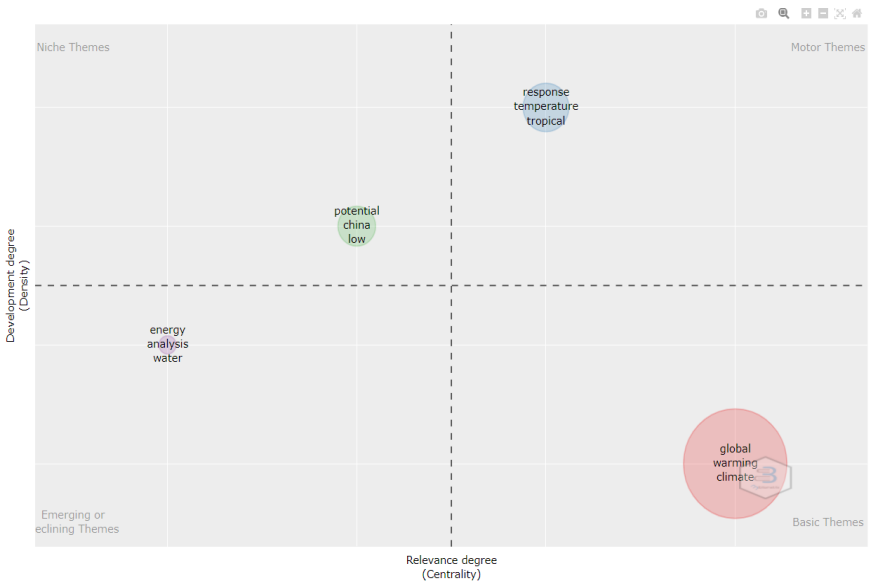


Figure 3: Thematic map by title through Biblioshiny software

Factorial Analysis of Word Map: Keyword Plus

Co-word analysis is a technique for evaluating co-occurrences of keyword plus and mapping and clustering terms from bibliographical metadata such as keywords, titles, and abstracts to identify relationships and develop research trends in the disciplines being examined. To create a conceptual structure map of the area, we used dimensionality reduction techniques, Multiple Correspondence Analysis (MCA), and K-means clustering to group together clusters of related concepts. This factorial analysis of word map has been created with help of Biblioshiny software. Figure (4) shows the factorial analysis of word map by keyword plus of global warming research during 2011-2020. All the selected words were grouped in two clusters. **Cluster 1** (red color) consists of 31 keywords plus namely global. Warming, climate. Change, carbon. Dioxide, climate. Modeling, climate. Models. Greenhouse. Gas, greenhouse. Gases, global. Warming. Potential, China, sea. Surface. Temperature, Methane, air. Temperature, climate. The effect, atmospheric. Temperature, pacific. Ocean, nitrous. Oxide, precipitation. Climatology. United. States, life. Cycle, temperature. The effect, environmental. Impact, Carbon, Rain, gas. Emissions, extreme. The event, computer. Simulation, Tropics, Oceanography, regional. Climate, global. Climate and carbon. Emission.

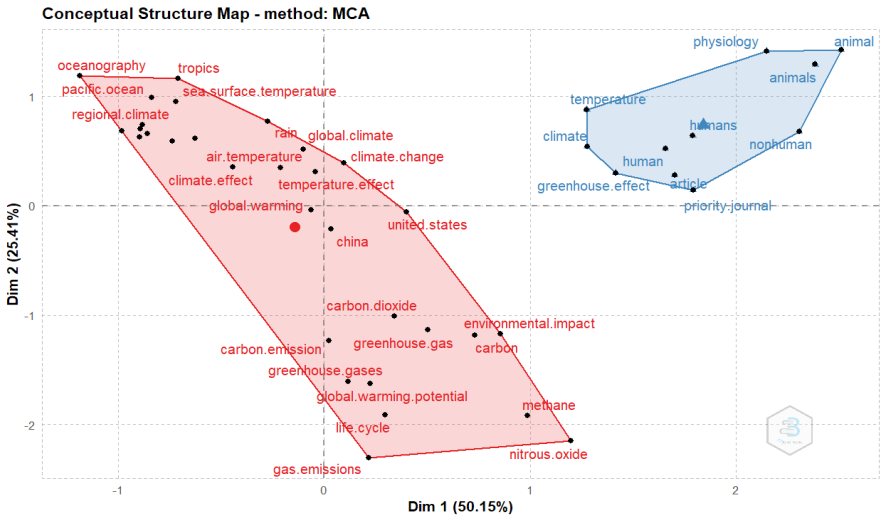


Figure 4: Factorial analysis of word map through Biblioshiny software

Cluster 2 (Blue color) represented 11 keywords, such as a greenhouse. Effect, article, temperature, Human, priority. Journal, animals, nonhuman, animal, climate, humans, and physiology. Co-word analysis can help cluster documents because these words are used together and help build a practical conceptual structure map of the bibliographical data frame.

Author Collaboration Network

The Author Collaboration Network is a network of relationships/ interconnection between authors in a dataset. When two authors are identified as authors in the same database, they collaborate. These interconnections are represented as nodes in a network, with links joining nodes representing relationships. The collaboration network between authors is depicted in this study, as indicated in Figure (5). Cluster 1 (red color) is represented by four nodes/authors: xie sp, liu q, liu w, and Zheng xt. Cluster 2 (blue color) comprises five nodes/authors: zhang x, liu y, wang j, zhang j, and li l. Cluster 3 (green color) consist of 7 nodes/authors: wang y, chen j, li z, li t, liu l, xu h, and he c. Cluster 4 (purple) comprise of 8 nodes/authors: Chen y, luo y, huang j, liu x, lu j, wang l, xu y, and zhang z. Cluster 5 (orange) consists of 6 nodes/ authors: li y, zhang l, zhang w, chen x, zhou t, and wu l. Cluster 6 (brown) comprises of 8 nodes/authors: wang x, huang p, li j, liu j, chen d, huang g, wang t, and jiang d.

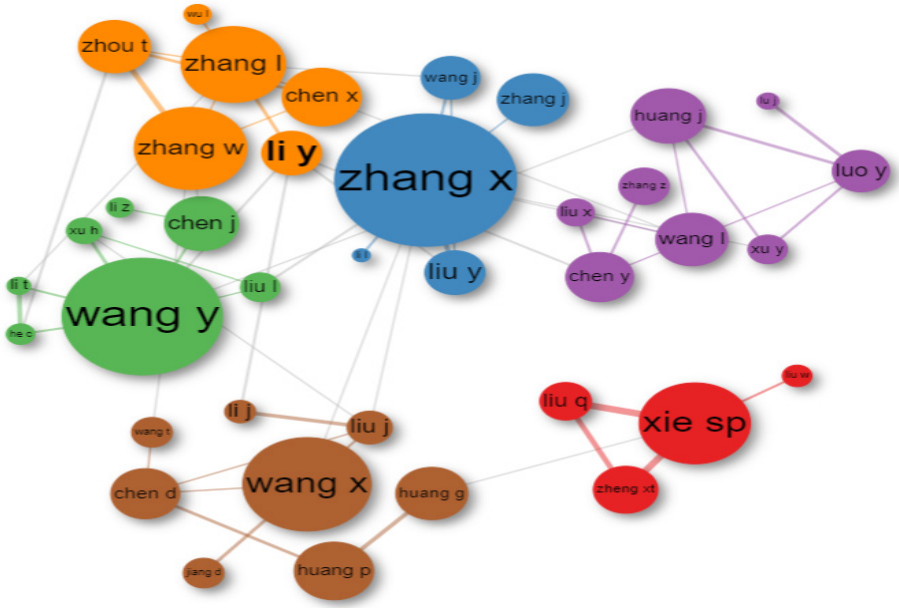
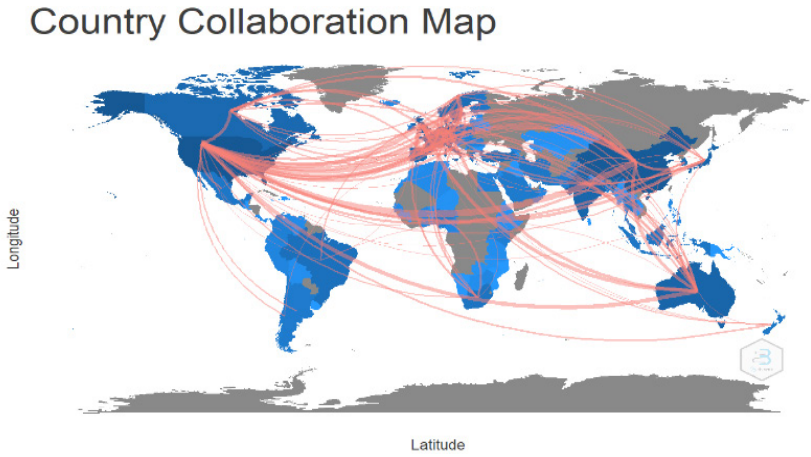


Figure 5: Author collaboration network developed through Biblioshiny softwar

International Collaboration Map

Figure (6) demonstrates the international collaboration on global warming publications. The USA appeared as the top collaborator with China (Freq=173 papers), followed by The USA and UK (Freq=88 papers), The USA and Australia

(freq=64 papers), The USA and Germany (Freq=55 papers), and the UK and Germany (Freq=54 papers). The USA and Japan was the least collaborator country in the list. The Figure reveals that the USA has six collaborations with other countries (China, UK, Australia, Germany, Canada, and Japan).



Rank	From	To	Freq	Rank	From	To	Freq
1	USA	CHINA	173	6	CHINA	UNITED KINGD	47
2	USA	UNITED KINGDOM	88	7	UNITED KINGDOM	AUSTRALIA	47
3	USA	AUSTRALIA	64	8	USA	CANADA	41
4	USA	GERMANY	55	9	CHINA	AUSTRALIA	39
5	UNITED KI	GERMANY	54	10	USA	JAPAN	36

Figure 6: Country collaboration map generated through Biblioshiny software

Three-field Plots Between the Country, Authors and Affiliations

Figure (7): demonstrates research publications on global warming based on the relationship between country authors and affiliations. The analysis shows the top three countries, i.e., China, the USA, and the UK had a strong relationship with most of the prolific authors, i.e., **6.14. Three field plot of country, author and Affiliations:** The figure (7) reveals the relationship between country, auhors and affiliations in the field of global warming. The most productive authors (Wang Y, Zhang X, Wang X, Xie SP, Li Y, Chen J, Leiserowitz A, and Liu Y) from China, USA and UK , associated with Nanjing information science and technology, Chinese Academy of Sciences, University of California, and Yale University are mostly prouductive in the literature of global warming.

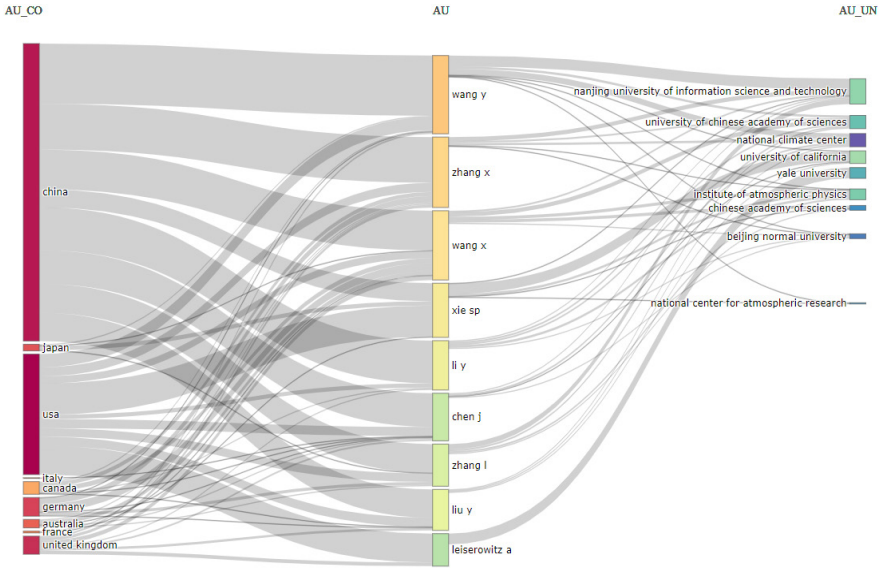


Figure 7: Three-factor analysis of the relationship between the country, authors, and affiliations through Biblioshiny software

Highlights

1. 2020 recorded the highest number of research on global warming with 522 publications
2. 2011 was the most important in term of total citation per article with 40.39
3. The relative growth rate decreased from 2012 (RGR=0.72 to 2020 (RGR=0.15)
4. Doubling time increased from 2012 (DT=0.96) to 2020 (DT=4.77)
5. The researcher preferred to publish global warming research in article form with 2862 (74%) publications
6. Journal of climate was the most relevant source in global warming research, with 116 publications
7. *Nature* has the highest Journal impact factor (JIF=42.77)
8. *Nature climate change* received the highest number of total cation (TC=8015) for producing 47 research papers on global warming
9. Zhang X, affiliated with the Center for Ocean and Climate Research, China, was the most prolific authors with 30 papers with 732 total citations
10. Single authorship pattern is more prominent in global warming research with 793 Publications

11. The USA was the most contributed country with 1860 publications and 23557 citations.
12. The University of California, USA was the most contributed institution in global warming research with 123 publications
13. The title "Increasing drought under global warming in observations and models" (2013) by Dai A was the most cited research publication in global warming with 1876 citations.
14. The analysis reveals four types of research themes in global warming, namely is global warming climate, response temperature tropical, potential China low, and energy analysis water
15. The most collaborative country in global warming research was the USA VS China, with 173 publications.

Conclusion

The overall goal of this study is to find out the bibliometric review of global research publications in the field of global warming between 2011 and 2020. Global warming research has been increased noticeably since 2015. Most of the global warming research was produced from the USA and received the highest total citations. As far institution, the University of California, USA was the leading organization. The research trends show that authors are more comfortable working collaboratively on this topic. Most of the research papers were published in the "*Journal of climate*." Journal articles are the major form of research in global warming. The USA, with China, was the most collaborative country. Research trends showed four global warming research themes: global warming climate, response temperature tropical, potential China low and energy analysis water. This quantitative bibliometric analysis is designed to give researchers, funding organizations, Environmentalist, and policymakers guidance on the strength and missing holes in the field of global warming research.

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21

Journal of Information Processing and Management: A Bibliometric Study

Hem Chandra

Abstract

The purpose of this study is to analyze, Authorship pattern, Type of citations, Number of citations, Relative use of various types of documents, Volume-wise distribution of contribution, Volume-wise geographical distribution, Research productivity, National and International level research productivity of the article "Journal of Information Processing And Management" During 2011-2019. Total 754 research papers published in this journal under study period. The articles of Journal of Information Processing and Management can be obtained from website www.journals.elsevier.com. The data for the study was downloaded from online database SCOPUS for 09 years from volume 47 (2011) to volume 57 (2019). Editorial published in the journal has not been included in the analysis. The result shoes that more than three authored paper (35.54%) have dominance in the field of library and information science, Library & Information Professionals use articles (97.35%) as a document for their research, Publication productivity of articles is 83, The highest contribution on each volume is more at international level, Kolkata contributes maximum researches articles i.e. 8(25.80%) at national level, and 8(1.06%) in the source journal, China has maximum contribution 136(18.81%) in the source journal. All the studies point out the merits and weakness of the journal which will be helpful in future to all the beneficiaries associated with it.

Keywords: *Bibliometric, Journal of Information Processing and Management, Information Science, Library Science, Bibliography, Authorship pattern, Source of Information, Geographical distribution, Citation.*

Introduction

Journals are an important medium of communication for researchers. They bring the latest knowledge to the notice of researchers. "Journal of Information Processing and Management" (IP&M) is a bimonthly academic journal published by Elsevier. IP&M is a peer reviewed journal focused on publishing articles in the field of "Information and Computational Sciences". The journal was founded as "Information Storage and Retrieval" in 1963. In the 1975, the journal changed its name to "Information Processing and Management" (IP&M). The journal aims to serve the interests of primary researchers but also practitioners in furthering knowledge at the intersection of "computing and information science" by providing an effective forum for the timely dissemination of advanced and topical issues. The journal is especially interested in original research articles, research survey articles, research method articles, and articles addressing critical applications of research. IPM is indexed in, among others, the following indexing and abstracting services: "Social science citation index", "Web of Science", categories of "Computer Science, Information Systems" and "Information Science Library Science", "Scopus", ERIC, "Information Science Abstract", "Library and information science Abstract" (LISA) and PASCAL/CNRS. Specifically, the journal is interested in four types of manuscripts, which are:

1. Research manuscripts addressing topics at the intersection of computer and information science. Methods manuscripts focusing on the application of novel methods at the intersection of computer and information science.
2. Review manuscripts assessing, in a critical and in-depth manner, a broad trend at the intersection of computer and information science, providing integration of the prior research, and recommendations for further work in the area.
3. Critical application manuscripts concerning system design research at the intersection of computer and information science.

In 9 years with the publication, this journal has recorded its significant achievement in the field of library science. With an average of 83.77 articles the journal of information processing and retrieval published total 754 articles under the study period. The study has been undertaken with a view to understand the changing pattern in authorship, references and other bibliographic parameters during 2011 to 2019.

Review of Literature

William Gray Potter (1981) the main aim of this research paper to give a concept of bibliometric and indicate the direction of bibliometrics present &

future. In his view bibliometric is a study to measurement of the papers or articles pattern of all forms of written communication and their author.

Verma, Tamrakar and Sharma (2007) found that most of the articles in the journal are written by two authors and that most of the contributions come from New Delhi.

Singh, Mittal and Ahmad (2006) conducted a bibliometric review of the digital library literature. Important findings are that most articles (61%) are single author; the author's productivity does not comply with Lotka's law, except in a case where the number of articles is three; the maximum number of articles was published in 2003 with English as the most productive language; as many articles as possible have been published in D.lib Magazine; the distribution of articles almost follows Bradford's law; and the United States in first place for maximum number of magazines.

Tiew (2000) found that 53% of articles contained self-citations from journals and that authors affiliated with the institution that publishes the journal tend to cite the journal.

Patra, Bhattacharya and Verma (2006) analyzed the growth pattern, leading journals, and author distribution in bibliometrics using data from the Library and Information Science Abstract (LISA) and found that the growth of the literature has shown no definite pattern. Dhiman (2000) conducted a ten-year bibliometric study in the Ethno botany Journal published in 1989-1998. This article examines on an annual basis, the type of citations, the number of citations, the geographical distribution by country, the type of authors, the range of references cited and the length of the articles.

Objectives

1. To examine authorship pattern of the contributions.
2. To analyze type of citations.
3. To analyze the number of citations.
4. To find out relative use of various types of documents by the authors.
5. To plot the volume-wise distribution of contribution.
6. To indicate volume-wise geographical distribution of the contributors.
7. To find the research productivity count of the contributions on the basis of geographical distribution both at national level.
8. To find the research productivity count of the contributions on the basis of geographical distribution both at international level.

Methodology

The collection of data is extremely important and main part of research because the conclusion of the study is based on what the data reveals. The

secondary data method is adopted for collection of data. Total 754 research papers published in this journal under study period. The data for the study was downloaded from online database SCOPUS for 09 years from volume 47 (2011) to volume 57 (2019). The data consists of year of publication with its volume number, name of the author with their affiliations and its geographical location, total count of authors, length of the articles in terms of the number of pages, number of references cited by the article. Editorial published in the journal has not been included in the analysis. The data was downloaded on MS Excel sheets. Data was analyzed to meet the objectives mentioned above. Complete count method has been followed for the analysis of the data.

Data Analysis

Table 1: Authorship pattern of the papers

Years	One Author	Two Authors	Three Authors	More Than Three Authors	Total Articles
2019	5	36	59	64	164
2018	3	23	21	32	79
2017	9	18	28	22	77
2016	6	22	20	28	76
2015	2	17	24	25	68
2014	5	6	24	17	52
2013	16	23	18	32	89
2012	5	24	30	23	82
2011	6	19	17	25	67
TOTAL	57	188	241	268	754

Table 1 shows the authorship pattern of the paper published in IP&M journal during 2011- 2019. Maximum number of papers (35.54%) was from more than three authors followed by three authored paper (31.96%). The table also depicts year wise authorship pattern. Papers by one or two authors comprise a mere 7.55% and 24.93%, respectively.

Table 2: Number of articles cited

Volume Number	Number of Citation	Percentage %
56	625	5.19
54	1031	8.22
53	1405	11.20
52	1780	14.19

Volume Number	Number of Citation	Percentage %
51	1687	13.45
50	990	7.89
49	1810	14.43
48	1679	13.39
47	1505	12.00
TOTAL	12539	100%

Table 2 shoes that there are 12539 citations in 9 volumes of the source journal. Volume 49 has the most number of citations 1810(14.43%) following are volume 52, 1780 (14.19%), volume 51, 1687 (13.45%), volume 48, 1679 (13.39%), volume 47, 1505 (12%), volume 54, 1031 (8.22%), volume 53, 1405 (11.20%), volume 50, 990 (7.89%) and volume 56, 652 (5.19%).

These facts show that there are not equal patterns of citations

Table 3: Types of Documents cited (volume-wise)

Volume No.	Articles	Editorial	Erratum	Conference
56	159	4	1	
54	78	1		
53	75	2		
52	73	2	1	
51	64	2	1	1
50	52			
49	87	2		
48	82			
47	64	2	1	
TOTAL	734	15	4	1
PERCENTAGE%	97.35%	1.99%	0.53%	0.13%

Table 3 indicates 6 issues of 9 volumes of Information Processing & Management contains of 12539 citations. On the basis of analysis, it is obvious that Library and Information Science professionals concerned their journals for their articles i.e. 734(97.35%) citations. This is followed by editorials 15(1.99%), erratum 4(0.53%) and conference 1(0.13%).

Table 4: Volume-wise distribution of contributions

Year	Vol. No.	Issue No.	No. of Contribution	Percentage%
2019	56	6	164	21.75
2018	54	6	79	10.47
2017	53	6	77	10.21

Year	Vol. No.	Issue No.	No. of Contribution	Percentage%
2016	52	6	76	10.07
2015	51	6	68	9.01
2014	50	6	52	6.89
2013	49	6	89	11.80
2012	48	6	82	10.87
2011	47	6	67	8.88
TOTAL			754	100

As indicated in table 4 the total number of contributions in 6 issues of 9 volumes of source journal is 754 of which highest contribution are in the volume 56 i.e., 164 (21.75%) followed by the volume 49 (11.80%), volume 48 (10.87%), volume 54 (10.47%), volume 53 (10.21%), volume 52 (10.07%), volume 51 (9.01%), volume 47 (8.88%) and volume 50 (6.89%).

Table 5: Use of various types of Documents

Volume No.	Articles	Editorial	Erratum	Conference
56	159	4	1	
54	78	1		
53	75	2		
52	73	2	1	
51	64	2	1	1
50	52			
49	87	2		
48	82			
47	64	2	1	
TOTAL	734	15	4	1
PERCENTAGE%	97.35%	1.99%	0.53%	0.13%

Table 5 shows that the contributors preferred articles 734(97.35%) followed by editorials 15(1.99%) and so on this indicates that authors extracted articles for their academic research rather than other types of documents.

Table 6: Volume-wise geographical distribution of the contributors

Contributions	V56	V54	V53	V52	V51	V50	V49	V48	V47
National Level	8	4	4	3	3	3	0	5	1
International Level	156	75	73	73	65	49	89	77	66
TOTAL	164	79	77	76	68	52	89	82	67

Table 6 indicates that the contribution in the National level volume 56 is 8, volume 54 is 4, volume 53 is 4, volume 52 is 3, volume 51 is 3, volume 50 is

3, volume 49 is 0, volume 48 is 5 and volume 47 is 1. Similarly, at international level contributions of the contributors are volume 56 is 156, volume 54 is 75, volume 53 is 73, volume 52 is 73, volume 51 is 65, volume 50 is 49, volume 49 is 89, volume 48 is 77 and volume 47 is 66.

Table 7: Geographical distribution of contribution (National)

S.No.	NAME OF THE STATE	NO. OF CONTRIBUTION	PERCENTAGE %
1	Kolkatta	8	25.80
2	Uttar Pradesh	4	12.90
3	Punjab	3	9.67
4	Tamil Nadu	3	9.67
5	Karnataka	2	6.45
6	Delhi	2	6.45
7	Maharashtra	2	6.45
8	Rajasthan	2	6.45
9	Bihar	1	3.22
10	Assam	1	3.22
11	Gujarat	1	3.22
12	Madhya Pradesh	1	3.22
13	Karnataka	1	3.22
TOTAL		31	100

Table 7 indicates Kolkata contributes maximum research articles i.e. 8(25.80%), in the source journal followed be Uttar Pradesh 4(12.90%) also Punjab with 3(9.67%) and Tamil Nadu with 3(9.67%) contributes equal and so on.

Table 8: Geographical distribution of contributions (International)

S. No.	Name of the Country/State	No. of Contribution	Percentage%
1	China	136	18.81
2	United States	92	12.72
3	United Kingdom	89	12.30
4	Italy	60	8.29
5	Spain	56	7.74
6	South Korea	47	6.50
7	Canada	39	5.39
8	France	34	4.70
9	Australia	33	4.56

S. No.	Name of the Country/State	No. of Contribution	Percentage%
10	Japan	28	3.87
11	Iran	22	3.40
12	Turkey	22	3.04
13	Brazil	20	2.76
14	Singapore	18	2.48
15	Malaysia	15	2.07
16	Pakistan	10	1.38
17	South Africa	2	0.27
TOTAL		723	100

Table 8 revels about the geographical distribution of contributions at international level. The study shows that China has maximum contribution i.e. 136(18.81%), followed by U.S 92(12.30%), U.K 89(12.30%), Italy 60(8.29%), Spain 56(7.74%), South Korea 47(6.50%), Canada 39(5.39%), France 34(4.70%), Australia 33(4.56%) Japan 28(3.87%) and so on.

Findings and Conclusion

Findings The following findings are drawn from data analysis and interpretation: -

1. More than three authored paper (35.54%) have dominance in the field of library and information science.
2. Volume 49 has maximum number of citations 1810(14.43%).
3. Library & Information Professionals use articles (97.35%) as a document for their research.
4. The highest contribution came from volume 56 i.e. 164(21.75%) in the year 2019.
5. The average number of contribution per volume is 83. This means that in each volume publication productivity of articles is 83.
6. The contributors prefer to contribute more on articles rather than on any other document (97.35%).
7. The highest contribution on each volume is more at international level.
8. The international level contribution (95.88%) is in dominance with national level.
9. Kolkata contributes maximum researches articles i.e. 8(25.80%) at national level, and 8(1.06%) in the source journal.
10. China has maximum contribution 136(18.81%) in the source journal.

Conclusion

It should be highlighted that the articles are the key method of communication by researchers, supplying a primary indication on the quantum associated with work carried out in different. Information Processing & Management Journal published by Elsevier. The journal has wide readership all over the world. IP&M is committed to being the premier journal in the information science field, including computational science, analytics, social media computing, information retrieval, information behavior, and related areas. It scope includes human computer interaction (HCI) aspects of any area in the information science field. The numbers of papers are increasing substantially. It fulfill its aims to serve the interests of primary researchers but also practitioners in furthering knowledge at the intersection of computing and information science by providing an effective forum for the timely dissemination of advanced and topical issues.

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22

Top 100 Most Cited Papers of University of Calcutta in Open Access Platform: A Bibliometrics Analysis

Deep Kumar Kirtania & Biplab Chakrabarti

Abstract

The purpose of this study is to trace out and analyse the 100 most cited open access research publications, published by University of Calcutta, routinely indexed in Scopus database. 100 most such publications have been selected using filtering technique published by the University through affiliation search from Scopus database. The study revealed that selected research papers were published during 1990 to 2020, with a large number of citations (13842). The most significant findings in this study are the dominance of shared authorship (0.97%), supremacy of science subjects in terms of subject coverage and more than half of the publication had foreign collaboration. This bibliometric study also revealed that faculty members of the University of Calcutta have published quality research materials on open access environment.

Keywords: *Bibliometrics, Degree of Collaboration, University of Calcutta, Scopus, Open Access*

Introduction

The University of Calcutta was established on 24 January 1857 and is the first modern university in colonial India. It is the only University in India with four Indian Nobel laureates involved. The University of Calcutta was awarded the status of "University with Potential for Excellence" by the University Grants Commission (UGC). At present the University of Calcutta has twenty-one Centers and seven Deans of the Faculties, as well as 152 affiliated Colleges

under the University. The rankings assigned by various organizations in India and around the world have for a long time added one or the other honor to the crown of University of Calcutta almost every year (University of Calcutta, 1857). Therefore, library and information science professionals should analyze the research output of such an important educational institution. Open Access has become known as one of the most popular channels of scholarly communication around the world in this century (Laakso et al, 2011). Along with subscribed publications, there has been a huge increase in open access publications. The most important publications of any organization would receive most of the citations. Therefore, by analyzing these peer-reviewed papers, various important aspects of the papers such as authorship pattern, publication source etc., can be easily understood (Asiri, Kruger & Tennanat, 2021; Baldiotti et al 2021). In the present work, the bibliometrics of 100 most cited papers of open access published by University of Calcutta have been analyzed to understand the research trend.

Review of Related Literatures

There have been many good research papers published in the past and recently of university research community pointing towards its productivity. Along with many research institutes in India, in the yesteryears, bibliometrics studies have also been undertaken towards assessing the research productivity of several universities, run by the state government. In the case of West Bengal, a Scientometrics study has been done with the contribution of science and technology from Jadavpur University indexed in Web of Science database. The study analyzed 695 published research papers on the Web of science indexed shows that the most published articles in chemistry and polyhedron journals and Calcutta University is the leading national collaborative institute (Mondal & Raychoudhury, 2017). Teli and Dutta (2016) analyzed the research trends of Vidyasagar University during 1989 to 2014 in their paper in respect of several bibliometrics indicators. Notable findings of the work are the most published research on Chemistry and Calcutta University has secured the second position in Top Collaborating Institutions. The research contribution of the University of Burdwan and Kalyani University during the year 2000 to 2019 has been studied by Bid and Mandal (2021) through their Scientometrics analysis. Sarkhel and Raychoudhury (2010) conducted a bibliometric study on the contribution of Bidhan Chandra Krishi Viswavidyalaya during 1993 to 2007 in agricultural research. The study analyzed 2807 research papers published by CAB Abstracts and found collaborative authorship pattern. Number of bibliometrics studies has been conducted on the research productivity of several departments of the University of Burdwan such as physics (Nandi & Bandyopadhyay, 2009), chemistry (Nandi & Bandyopadhyay, 2009), zoology (Nandi & Bandyopadhyay, 2010) and mathematics (Nandi & Bandyopadhyay,

2011). The research contribution, authorship pattern, subject category, etc., of those departments have been analyzed in detail from these research papers. Nishat, Chakrabarti & Kirtania (2019) did a bibliometric study on M.Phil dissertations awarded under Department of Library and Information Science, University of Calcutta during 2004 to 2016.

Objectives

The main objective of this study is to analyze the top 100 most cited papers published on the open access platform of the University of Calcutta from the perspective of bibliometrics to find the research trend.

Methodology

The data required for this bibliometrics analysis are taken from the Scopus database which is a vast abstracting and citation database published by Elsevier. This was done using the affiliation search technique of the Scopus database, from which 22,280 papers were retrieved. Then only open access is selected by filtering from the retrieved result from which 3135 papers are found to match the filter and from that, the most cited 100 papers have been selected for this study. All of the hundred selected papers have been accessed individually for data collection based on certain parameters such as publication year, author, time specified and subject, etc. The selected data is then stored in MS Excel for further analysis. The final conclusion is then drawn on the basis of that analysis consistent with the objectives of the study. A number of statistical strategies such as Mean, Relative Growth Rate, and Rank Correlation have been used to complete this study in a befitting manner.

Analysis & Findings

Table 1: Year Wise Distribution of Papers and their Citations

Year	Papers	Cumulative	Relative Growth Rate	Citations	Relative Growth Rate	% age	Citation/ Paper
1990-1995	04	0		439	-	3.17	109.75
1996-2000	12	4	1.09	1105	0.93	7.98	92.08
2001-2005	15	16	0.23	1669	0.41	12.06	111.27
2006-2010	27	31	0.59	3588	0.77	25.92	132.89
2011-2015	31	58	0.13	2850	-0.23	20.59	91.94
2016-2020	11	89	-1.03	4191	0.38	30.28	381
Total	100	100	Mean 0.20	13842	Mean 0.45		138.42

Table 1 describes the year wise distribution of papers and their Citations. Here it is seen that the number of papers has increased proportionately with time with a positive trend. Most papers have been published between 2011 and 2015, but those papers are in the list of 100 as the most cited papers which is a significant finding of this study. The linear trend line value ($R^2 = 0.20$) of the papers indicates the overall positive trend throughout the study time span (Fig 1).

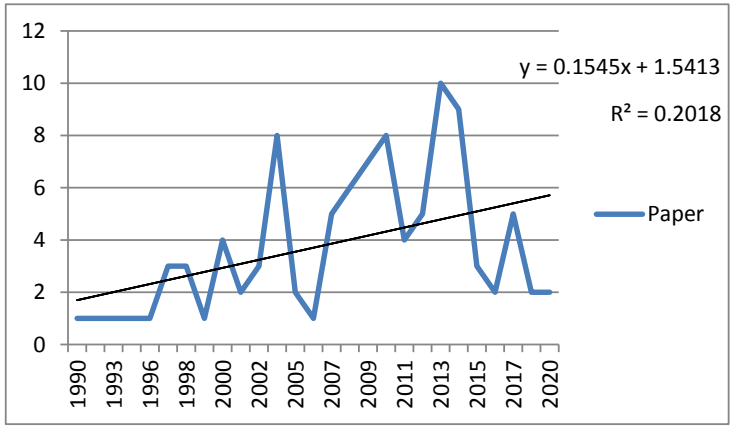

Figure 1: Year Wise Distribution of the Papers

Similarly, the citation distribution of the articles has had a positive effect. In the case of Relative Growth Rate (Mahapatra, 1985), the mean value of both the papers and their citations is positive, although the mean of citation is more than double than that of mean of the papers published, which means that the impact of citation is much more than the articles themselves. This study revealed a significant positive relationship between the papers published during the study time span and their citations from the Rank Correlation of publications & citations (Table 2).

Table 2: Authorship Pattern & Degree of Collaboration

Year	Authorship Pattern				Total	Degree of Collaboration
	Single	Double	Three	> Three		
1990-1995	0	0	0	4	04	1.00
1996-2000	2	2	3	5	12	0.83
2001-2005	0	2	3	10	15	1.00
2006-2010	0	5	5	17	27	1.00
2011-2015	1	2	4	24	31	0.97
2016-2020	0	0	1	10	11	1.00
Total	3	11	16	70	100	0.97

Table 2 describes the authorship pattern & degree of collaboration of theses papers. Out of 100 papers, only three are published by a single author, which means that there is a strong dominance of shared authorship. In the case of year wise distribution, it is seen that four out of six times all the articles have been published through joint authorship pattern. The Degree of Collaboration (Subramanyam, 1983) value of all the papers is 0.97, which points towards the fact that these papers have a predominance of joint authorship.

Table 3: Authorship Wise Citation Rate

Authorship Pattern	Paper	Total Citation	Citation/Paper	Percentage
Single	3	246	82	1.78
Double	11	1218	110.73	8.80
Three	16	2249	140.56	16.25
> Three	70	10129	144.7	73.18
Total	100	13842	138.42	100

Table 3 describes the authorship wise citation rate. From this table it was found that papers published by more than three authors received the most citations, followed by three and two authored papers. It is noteworthy here that as the number of authors has increased, so has the citation, Citation per Paper and the Average. In the case of value of group co-efficient for collaborative authors of articles (G_P) & citations (G_C) (Mahapatra, 2000) the value of citation in joint authorship is slightly higher than in paper (vide Table 4).

Table 4: Value of group co-efficient for collaborative authors of articles & Citations

Authorship Pattern	Paper	Value of per $G_P = \frac{Nm}{Nm+Ns}$	Total Citation	Value of per $G_C = \frac{Nm}{Nm+Ns}$
Single Author	3	-	246	-
Joint Author	97	0.97	13596	0.98

Table 5: Type of Publications

Type of Publications	Paper	Citation	Citation/Paper
Article	93	10018	107.72
Book	1	3109	3109
Conference Paper	1	83	83
Review	5	632	126.4
Total	100	13842	138.42

Table 5 describes the type of publications of these most cited papers. Out of the 100 highly cited papers, 93 papers have been published as journal articles, besides five review papers and one book and one conference paper. From this number, it is clear that the publication trend has shifted towards primary literature. This will further increase the scope of core subject areas and basic research of a particular subject.

Table 6: Most Popular Source of Publications

Publication Name	Paper	Total Citation	Citation per Paper
Physics Letters, Section A: General, Atomic and Solid State Physics	4	383	95.75
Plant Physiology	4	477	119.25
Proceedings of the National Academy of Sciences of the United States of America	4	312	78
Persoonia: Molecular Phylogeny and Evolution of Fungi	3	381	127
Physical Review D - Particles, Fields, Gravitation and Cosmology	3	235	78.33
The Lancet	3	265	88.33
Biochemical Journal	2	160	80
Cell Death and Differentiation	2	272	136
European Journal of Human Genetics	2	218	109
Fungal Diversity	2	218	109
Indian Journal of Microbiology	2	340	170
Journal of Biological Chemistry	2	315	157.5
Journal of Physics A: Mathematical and General	2	287	143.5
Modern Physics Letters A	2	224	112
Nanoscale Research Letters	2	207	103.5
Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics	2	190	95
PLoS ONE	2	175	87.5
Saline Systems	2	160	80

Table 6 shows the most popular source of publications. All publication sources on this list are reputed peer-reviewed and trusted and time-tested journals, published by reputed publishing houses of long-standing history around the world. From the received citations of the articles published in these journals, it is credible to conclude that the quality of the journals is universally accepted. Physics Letters, Section A: General, Atomic and Solid State Physics, Plant Physiology and Proceedings of the National Academy of Sciences of the United States of America are at the top of the list with 4 articles each in the most popular publication source and the other 15 journals on the list are also worldwide famous for their publication reputation.

Figure 2 describes graphical representation of the ranking of most trusted subject of research. Reviewing the first 5 most trusted subjects, it is seen that applied science has a place in the list along with basic science subjects.

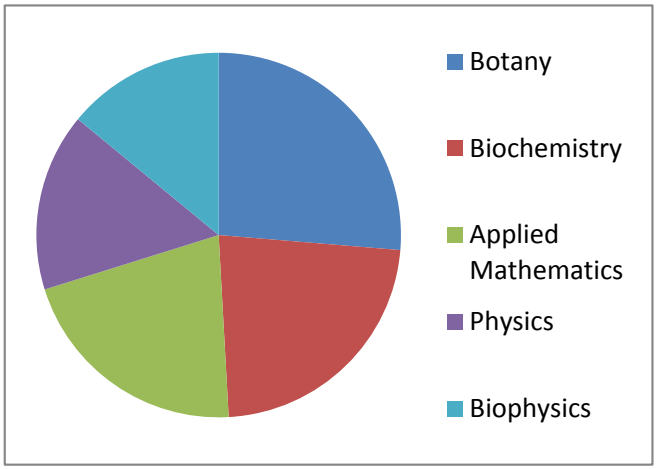

Fig. 2: Ranking of Most Trusted Subject of Research

Besides, all the subjects in the list are science subjects which easily proved that the dominance of science discipline in most cited papers is much higher than other subjects. Botany holds top position in the list with 15 percent of the published papers, followed by Biochemistry, Applied Mathematics, Physics and Biophysics. Since the science disciplines have dominated the research papers, therefore the words related to science has also been reflected in the title cloud word (Fig. 3).

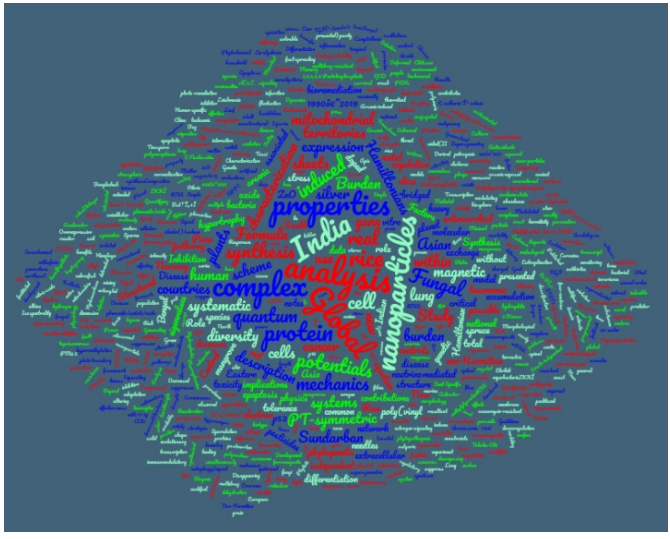

Figure 3: Word Cloud of Paper Title (https://www.wordclouds.com/)

Table 7: Ranking of Collaborative Countries

Country	Paper	Rank
United States of America	24	1
United Kingdom	17	2
Italy	16	3
China	14	4
Germany	13	5
Belgium	12	6
Japan	9	7
Australia	9	7
Russia	9	7
Canada	8	8
France	8	8
South Africa	7	9
Brazil	7	9
Czech Republic	6	10

Table 7 describes the ranking of collaborative countries which have worked together with University of Calcutta. It is good news for India that there are joint research publications of the members of the faculties from Calcutta University with the top countries in leading scientific research areas. This kind of collaborative work will reveal various aspects of research and will also increase its volume. The United States of America ranks first among the countries with the most publications, followed by United Kingdom and Italy.

It is worth mentioning here that the faculties of University of Calcutta have done collaborative research with many continental countries as well. Among the total collaborative papers, 53 (54.64%) have been published through international collaborations and the rest are the result of collaboration at the national or the state level (Table 8).

Table 8: Nature of Collaboration

Type of Collaboration Pattern	Paper	Citations	Percentage	Citation/Paper
Single Authorship	3	246	1.78	1.78
Domestic Collaboration	47	5564	40.20	118.19
Foreign Country Collaboration	53	5318	38.42	156.19
Total	100	13842	100	138.42

Table 9: Rank Correlation of Publications & Citations

Year	Publications		Citations		d = x-y	d^2
	Number	Rank (x)	Number	Rank (y)		
1990-1995	04	6	439	6	0	0
1996-2000	12	4	1105	5	-1	1
2001-2005	15	3	1669	4	-1	1
2006-2010	27	2	3588	2	0	0
2011-2015	31	1	2850	3	-2	4
2016-2020	11	5	4191	1	4	16
					0	22

From the table, n =6 and $\sum d^2 = 22$

The equation of Rank Correlation is described as follows:

$$R = 1 - \frac{6\sum d^2}{n^3 - n} = 1 - \frac{6 \times 22}{6^3 - 6} = 1 - \frac{132}{210} = 0.37$$

Value of Rank Correlation is between $-1 \leq R \leq +1$, so in this case the result is $-1 \leq 0.37 \leq +1$. From the equation it was observed that Rank Correlation of Journals and their citations fit the Rank Correlation equation[19].

Conclusion

University of Calcutta is a renowned institution which has earned a worldwide reputation for its teaching, learning and research. For more than 160 years, this educational institution has been working for the welfare of human beings of the country and welfare for the society at large. The way in which Calcutta University has achieved success by publishing scientific articles, books and review articles in open access platform is enviable for any institution. The parameters that were used in this study, such as growth, collaboration and all the results have indicated a journey towards a positive direction. As the number of research papers have grown with their citations and the rank correlation has also found to match the exact equation of this relationship between them. This study shows that the articles have been written ~~in~~ with joint authorship, published in highly reputed journals, dominance of science subjects and a lot of work has been done in collaboration with foreign countries. Finally, it can be said that the aspects of the institutional prosperity in the field of education and research at University of Calcutta have been reflected in this bibliometric analysis.

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23

Research Trends on Open Science: A Bibliometric Analysis and Visualization

Ayush Kumar Patel & Dr. Kunwar Singh

Abstract

This study examines Open Science research output at a global level from 1989 to 2021.The data was obtained from the Web of Science database. During the study, 1301 records were retrieved. The data was then visualized using VOSviewer software version 1.1.16. The finding revealed that Ross, Joseph S., and Bradley, Jean-Claude were the most prolific authors, with 7 documents. The leading organization on open science research was the MCGILL University, with 25 documents. Furthermore, the United States had supplied 442 documents, followed by England with 169 and Germany with 113. The finding indicates that there was a steady increase in open science research during the study period.

Keywords: *Bibliometric analysis; Visualization; Open Science; Open innovation; Research Trends; Web of Science; VOSviewer*

Introduction

People are concerned about the future of science at this time. The fact that scientific policy circles have become enamored of open science is all the more remarkable. The whole thing started in the late 2000s with murmurs about something called 'Science 2.0'. In January 2012, The New York Times had the foresight to promote the rebranding of this notion as "open science" (Mirowski, 2018). By bringing about socio-cultural and technological change based on openness and connectedness, Open Science has an impact on how research is conducted, executed, gathered, and appraised (Vicente-Saez& Martinez-Fuentes, 2018). As a result, Open Science is a new field of study.

Furthermore, in the field of library and information science, bibliometrics is a significant area of study. Pritchard coined the term bibliometrics in 1969 to describe a statistical strategy for quantifying all fields of knowledge (Patel et al., 2021). Several bibliometric analytical tools, such as VOSviewer, have also been developed to help scholars to better comprehend and analyzed the development and evolution trend. The goal of this study is to look at bibliometrics and visualizations of open science research.

Related Works

Many researchers have undertaken bibliometric analyses in numerous domains in recent years. The following are some instances of such research studies:

Murnaka et al. (2021) conducted a bibliometric study and visualization on educational technology research. This study analyzed that most cited writers were Liu, H., Ellaway, R., and Skiba, D.J. Aristovnik, Ravšelj, and Umek (2020) performed a bibliometric analysis of COVID-19 across science and social science research. The finding of the study reaveals that the USA, China and Italy dominate in COVID-19 research. Zurita et al. (2020) presented a bibliometric study in computer science research and observed that Massachusetts Institute of Technology (MIT), University of California Berkeley, Stanford University and International Business Machines (IBM) had the highest number of citations. Wang, Ho, and Fu (2019) studied a bibliometric analysis on sustainable city research based on natural science and social science. The study's findings concluded that China rated top in natural scientific research, while the United States ranked first in social science research. Laengle et al. (2018) explored the bibliometrics in operations research and management science. This study revealed that the Centre National de la Recherche Scientifique (CNRS) of France was the most productive university in a particular field.

Objectives of the Study

The following objectives of the study are:

1. To examine the publication trends with the citation on open science research during 1989-2021;
2. To study the visualization of the most productive and influential authors, most productive organizations, and countries; and
3. To find out keyword co-occurrence network visualization.

Methodology

The aim of the research is to provide a bibliometric analysis and visualization of open science research from 1989 to 2021. The data for this study was taken

from the Web of Science database. Web of Science is a bibliographic database that provides comprehensive citation data for various academic disciplines. The search keyword used "Open Science"in the title field. A total of 1301 records were retrieved on October 12, 2021, from global research publications on open science. After extracting the data, it was subsequently tabulated, examined, and analyzed. Also, the VOSviewer software version 1.6.16 was used to visualize the researched data as a network.

Results and Discussion

Year-wise Growth Trends of Documents and Citations

A total of 1301 Open Science documents indexed in Web of Science were reviewed in this study. Figure 1 shows the progress trend of published documents on Open Science from 1989-2021. Most documents (n=147) published in 2021. The publication trend of Open Science has increased from 1989 to 2021. Also, the citation trend of the documents published on Open science is shown in figure 1. A review of citations indicated that the documents of Open Science received 16434 citations from 1989-2021. The data distribution in figure 1 indicated that the trend of citations received by the document was ascending.

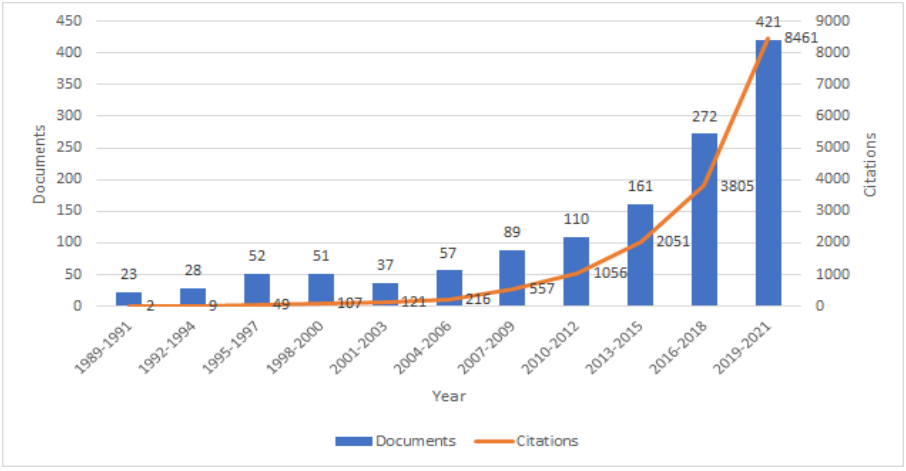

Figure 1: Year-wise growth trends of documents and citations

Visualization of the Most Productive and Influential Authors

Figure 2 indicates the densityvisualization of the most productive and influential authors. For mapping VOSviewer software used, the threshold was considered 10, and 33 authors with at least 3 documents in Open Science research could enter the density map. The yellow circle on this map represents

the number of documents. In other words, the larger the number of documents an author has the more yellow circles. As shown in the density map, the authors, including Ross, Joseph S. (7 documents), Bradley, Jean-Claude (7 documents), Krumholz, Harlan M. (6 documents), Therrien, William J. (5 documents), and Hesse, Bradford W. (5 documents) were considered as the most productive and influential authors.

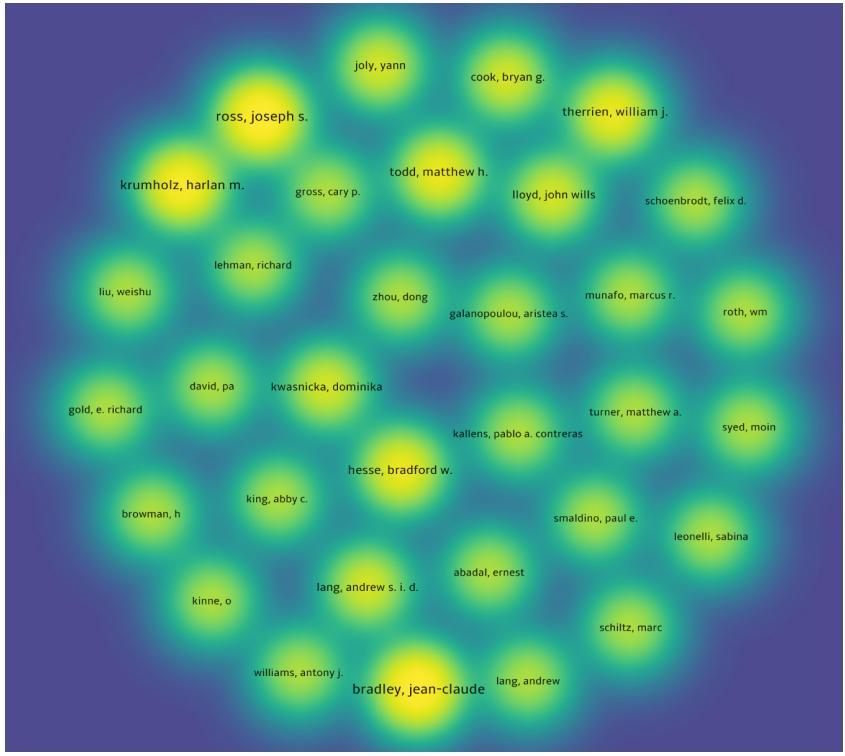

Figure 2: Visualization of the most productive and influential authors

Visualization of the Most Productive Organizations

Figure 3 shows the visualization of the most productive organizations on Open science research. The minimum number of documents of an organization was 5 fixed. Out of 1396 organizations, 83 meet the thresholds. In the figure, the bigger circle size indicates that the organizations are more productive. Therefore, the five organizations were most productive on Open Science research as follows: MCGILL University (25 documents), University of Oxford (18 documents), University College London (18 documents), University of Toronto (18 documents), and Stanford University (18 documents).

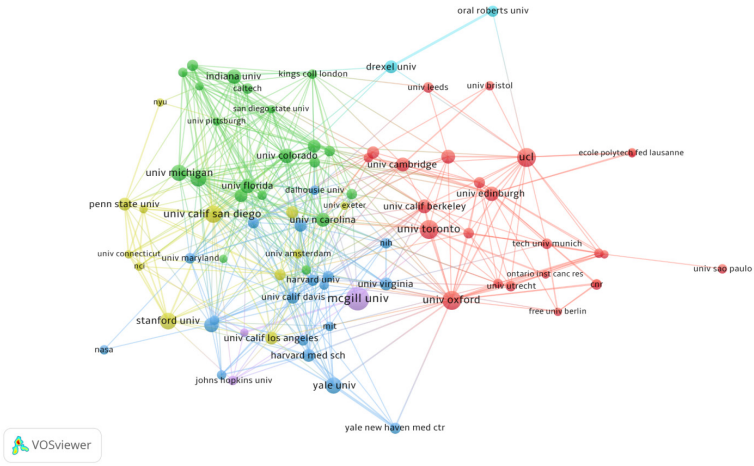

Figure 3: Visualization of the most productive Organizations

Visualization of the Most Productive Countries

Visualization of the most productive countries is shown in Figure 4. The data of visualization indicated that authors of 79 countries published documents on Open science. The minimum number of documents of an individual country was 5 fixed. Therefore, 36 countries meet the thresholds. The bigger the frame size indicates that the country publishes a more significant number of documents. The figure shows that "USA" as the most productive country with 442 documents was the first rank. With 169 and 113 documents, respectively, "England" and "Germany" were ranked second and third.

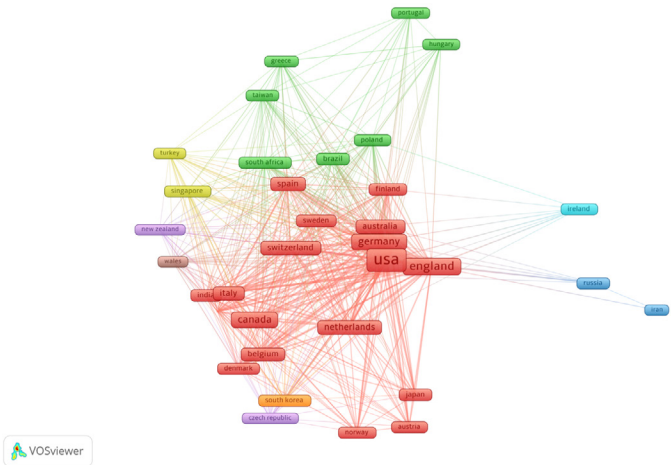

Figure 4: Visualization of the most productive Countries

Keyword Co-occurrence Network Visualization

Keywords serve as a summary of the literature and a description of the study's emphasis. The keywords present the core topic of the research article. The authors utilized the VOSviewer software to visualize the keyword co-occurrence network. In figure 5, all the keywords are divided into the following five clusters, indicated in red, green, blue, yellow, and purple, to represent the subdomains of the concept 'Open Science'. The red color can characterize the first cluster that deals with ideas like "Knowledge","Technology", and "Innovation". The second cluster in green color consists of keywords, including "Open Access","Journals", and "Publication". Cluster 3 is represented by a blue color that deals with "Open Science","Reproducibility", and "Replication". The fourth cluster in yellow color includes keywords such as "Citizen Science","Challenges", and "Open Sources". Purple color represents the fifth cluster that deals with ideas like "Education","Students", and "Thinking".

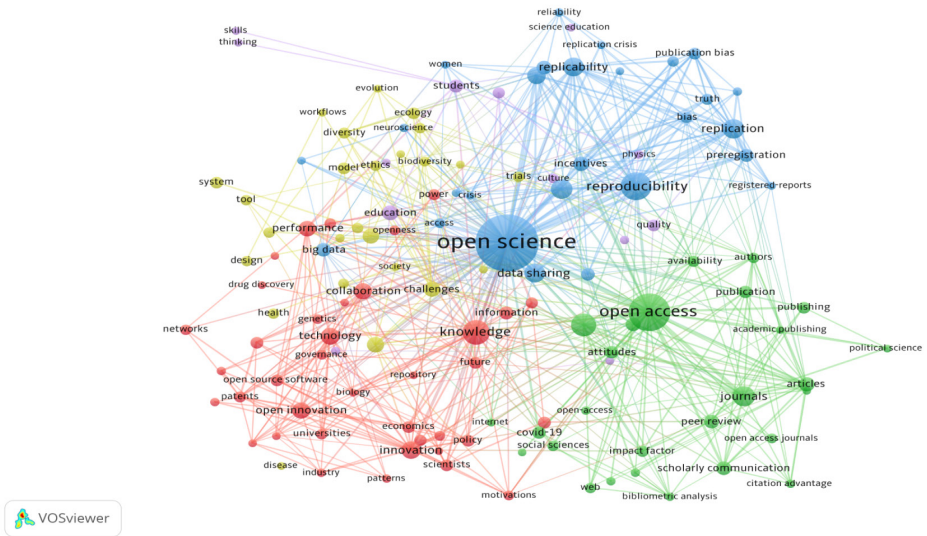

Figure 5: Keyword co-occurrence network visualization

Conclusion

This study aimed to perform a bibliometric analysis and visualization of research on Open Science from 1989-2021. It indicates an increase in trends in the documents year by year. It is also observed that Ross, Joseph S., and Bradley, Jean-Claude were the most productive and influential authors. It was noticed that the MCGILL University is a most productive organization on open

science research. Further, it is observed that most of the open science research is produced by the USA. These findings highlight the use of bibliometric tools in determining worldwide research trends in open science. Open Science is a disruptive phenomenon that is emerging around the world. However, this study will give good comprehension for the new researchers who want to research open science.

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24

Global Research Production of Green Tea: A Bibliometric Analysis

Pratibha Prajapati, Dr. Mahender Pratap Singh & Isha Arya

Abstract

The present study entitled "Global research Production of Green Tea: A Bibliometric Analysis" is a systematic study on the literature of Green Tea. Scopus database was used for data collection and total 6509 documents found during the study period from 2002 to September 2021. In this paper year 2020 was found most productive year and AGR was calculated only ten years 2012 to 2021. United States was on first position and India found in fifth position. Maximum literature was published in English language. Food Chemistry journal was on top with 169 articles followed by Journal of Agricultural and Food Chemistry with 164 articles. MS Excel was used for data analysis and Graph, table, pie charts were used for data presentation. The aim of this study is to identifying significance contribution on the literature of Green Tea. This study helps the future researcher and also beneficial for those companies who are producing Green Tea.

Introduction

This present study is based on the literature of 'Green Tea' through a bibliometric approach. Bibliometric Analysis is used as mathematical and statistical method for analyze books, texts and other communication. It is an emerging area in the field of library science in this we identify most valuable area and productivity of any literature. Lots of literatures are currently published in Green Tea so this bibliometric analysis examines the various dimensions to identifying the area of subject concerned. It also tracks the impact and output of researcher. In this present era, hot beverage is primary need for every human because this era is called Technological Era. As we

know national drink of India is Tea. It is popular and lowest cost beverage in the whole world because modern generation is workaholic and they want to readymade food and drink products. Specially this Bibliometric study on Green Tea, it is treated as a medicine and it's had many health benefits. Green Tea contains a catechin which is called epigallocatechin-3 gallete (EGCG) and antioxidants that prevent cell damage, improved brain functions and boost metabolism. It compounds bioactive which have various protective effects on brain and reduce the risk of Dementia (it is a common neurodegenerative disorder). As we know this era is pandemic era everybody talks about good food and good health so this study basically improves the quality of Green Tea and helps the companies who are producing Green Tea.

Review of Literature

Patil & Bachute (2021)we have carried the bibliometric review of the "Tea quality evaluation using artificial intelligence". Only the Scopus database is under consideration for this analysis. To coat all possible research approaches here we have generated the valid search queries which excludes irrelevant literature. The result analysis shows overall 602 useful papers are available on the tea quality evaluation out of which 12 papers are specifically on artificial taste perception of tea. This survey illustrates the emerging trend of quality evaluation and assurance (QEA examined the bibliometric analysis on "Tea quality evaluation using artificial intelligent". Total 602 papers found on the tea quality evaluation out of which 12 papers were observed on artificial taste perception of tea retrieved from Scopus database. Author used VoS viewer and Science Scope software for data analysis. China and India were observed on top position. National Natural Science Foundation was sponsored maximum number of publication 62 articles.

Singh & Bharati (2020) concluded a bibliometric analysis in Antibiotic Resistance. Author used Scopus database for data collection and total 445 papers found during the period from 2010 – 2019 and RGR in 2011. Journal of Clinical and Diagnostic Research secured the first position. In author wise production Tamhanker, A. found most productive author. Author used VoS viewer software for data visualization. Medicine subject found most productive subject during the study period.

Marx et al. (2017) author used Scopus database for data collection total 1059 articles found during the study year from 2015-2018. Maximum AGR was recorded in year 2018. In author wise ranking Johri, R. observed most prolific author followed by Chakraverty T. While the author examined Computer Science become most productive subject followed by Engineering and Mathematics and found maximum doubling time found in the year 2017.

Wambu et al., (2017) described a bibliometric approach in Global Tea research. Author used Science Citation Index expended database for data

collection. Author selected 1991 to 2014 year for study. Total twenty-one languages contribute in Green Tea field in which English language was observed the main language. In searching terms Tea was occurred in 8459 times followed by Green with 3035 times. Chinese Academy of Science, China was found most productive institution. Author found that USA and Japan top most productive countries in the field of Tea.

Sinija & Mishra (2008) concluded a study with major health benefits of Green Tea and main focused on catechins. Green Tea treated in cardiovascular diseases, oral cavity diseases, cardiovascular uses and Parkinson's diseases. This study demonstrates the benefits of Green Tea on human health. Author said that Green Tea is consumed allover world in various forms. It also well controlled epidemiologic studies, altered the brain agency process, which can serve as neuroprotective agents.

Research Methodology

For this bibliometric study Scopus database was used for data collection total 6509 documents retrieved during the study year from 2002 to September 2021. Author used this query in Scopusdatabase TITLE (green AND tea) AND PUBYEAR >2001 AND PUBYEAR< 2022. VoS viewer software was used for data visualization. Microsoft Excel is used for data analysis and graphical presentation of data.

Objectives of the Study

1. To find out the year wise publication of distribution and Annual Growth Rate in Green Tea literature.
2. To examined the highly cited article and country of Green Tea literature.
3. To identify the language and subject wise distribution of Green Tea research.
4. To study the most prolific author in the publication of Green Tea research.
5. To examine the productivity of journal in the field of Green Tea research.
6. To examine the visualization of highly cited author keyword occurrences in the publication of Green Tea.

Data Analysis and Interpreation

Total 6509 documents retrieved from Scopus database during the study period from 2002 -2021. Extracted data is interpreted and calculated on the basis of objectives.

1. Year wise distribution of Publication on Green Tea literature during the year from 2002 to 2021.

Year wise distribution of publication on Green Tea total 6509 publication found during the study year. Total twenty years data have been presented in Figure 1.

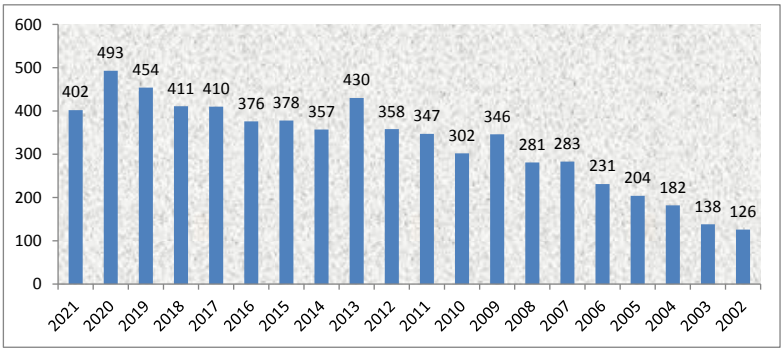

Figure 1: Year wise Publication on Green Tea literature

Figure 1 shows that the number of articles that are published in year wise. The most productive year was recognized 2020 with 493 articles followed by 2019 with 454 articles. The least number of articles was 126 in the year 2002. The number of articles has been decreased during the year 2021 to 2020.

2. Annual Growth Rate of Green Tea Literature

Table 2 shows that Annual Growth rate of Green Tea literature during the period from 2012 to 2021. It is found that Maximum AGR 20.11 % in the year 2013 followed by 10.46% in 2019. Further it is examined that the minimum AGR -18.45% in the year 2021 followed by -16.97 in the year 2014.

Table 2: Annual Growth Rate of Green Tea Literature

Year	Initial Value	End Value	AGR
2012	0	358	Not define
2013	358	430	20.11
2014	430	357	-16.97
2015	357	378	5.88
2016	378	376	-0.52
2017	376	410	9.042
2018	410	411	0.243
2019	411	454	10.46
2020	454	493	8.59
2021	493	402	-18.45

3. Highly cited Articles on Green Tea

Table 3 has been presented only top ten highly cited articles with their authors. It is observed that *Beneficial Effects of Green Tea – A Review* authored by Cabrera C., Artacho R., Giménez R title was highly cited articles with 1269 citations followed by *green tea atechins, epigallocatechin-3-gallate (EGCG): Mechanisms, perspectives and clinical applications* with 884 citations. Further it is seen that *green tea and its polyphenolic catechins: Medicinal uses in cancer and noncancer applications* received third highest citations while *A receptor for green tea polyphenol EGCG* was on tenth position with 542.

Table 3: Highly cited Articles on Green Tea

S.N.	Title	Authors	Cited by
1	Beneficial Effects of Green Tea—A Review	Cabrera C., Artacho R., Giménez R.	1269
2	Green tea atechins, epigallocatechin-3-gallate (EGCG): Mechanisms, perspectives and clinical applications	Singh B.N., Shankar S., Srivastava R.K.	884
3	Green tea and its polyphenolic catechins: Medicinal uses in cancer and noncancer applications	Zaveri N.T.	634
4	Targeting multiple signaling pathways by green tea polyphenol (-)-epigallocatechin-3-gallate	Khan N., Afaq F., Saleem M., Ahmad N., Mukhtar H.	627
5	Green tea consumption and mortality due to cardiovascular disease, cancer, and all causes in Japan: The Ohsaki study	Kuriyama S., Shimazu T., Ohmori K., Kikuchi N., Nakaya N., Nishino Y., Tsubono Y., Tsuji I.	615
6	Chemoprevention of human prostate cancer by oral administration of green tea catechins in volunteers with high-grade prostate intraepithelial neoplasia: A preliminary report from a one-year proof-of-principle study	Bettuzzi S., Brausi M., Rizzi F., Castagnetti G., Peracchia G., Corti A.	602
7	Pharmacokinetics of tea catechins after ingestion of green tea and (-)-epigallocatechin-3-gallate by humans: Formation of different metabolites and individual variability	Lee M.-J., Maliakal P., Chen L., Meng X., Bondoc F.Y., Prabhu S., Lambert G., Mohr S., Yang C.S.	593
8	Physical properties and antioxidant activity of an active film from chitosan incorporated with green tea extract	Siripatrawan U., Harte B.R.	575
9	Green tea epigallocatechin-3-gallate (EGCG) modulates amyloid precursor protein cleavage and reduces cerebral amyloidosis in Alzheimer transgenic mice	Rezai-Zadeh K., Shytle D., Sun N., Mori T., Hou H., Jeanniton D., Ehrhart J., Townsend K., Zeng J., Morgan D., Hardy J., Town T., Tan J.	543
10	A receptor for green tea polyphenol EGCG	Tachibana H., Koga K., Fujimura Y., Yamada K.	542

4. Language wise distribution of publication

Table 4 shows the Top ten languages of distribution during the study year on Green Tea literature. Figure described that the maximum number of articles published in English language with 6079 articles followed by Chinese language with 150 articles, Korean language with 84 articles during the study period.

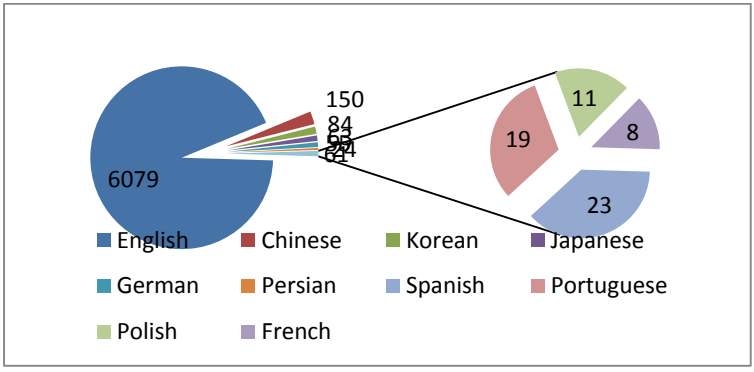

Figure 4: Language wise distribution of publication

5. Subjects' wise distribution of publication

Figure 5 reveals that subject wise distribution of publication on Green Tea during the study period. There is minimum 25 subjects publishing articles on Green Tea in which top ten are presented in figure. Medicine subject found top most productive subject with 2246 articles followed by Agricultural and Biological Sciences subject with 2065 articles.

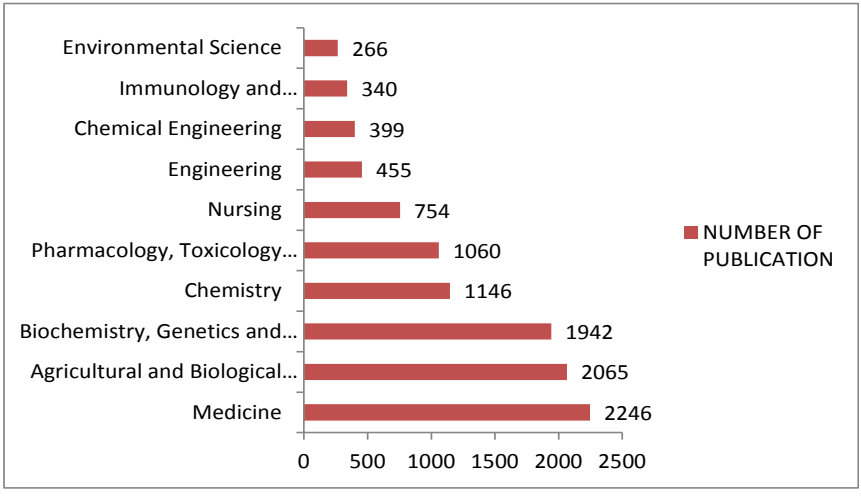

Figure 5

6. Visualization of highly cited countries

Table 6: Highly cited Countries

S. No.	Country	Documents	Total Link	Citations
1.	United States	589	245	56487
2.	China	339	147	22376
3.	Japan	319	80	24976
4.	South Korea	151	60	10394
5.	India	103	37	6876
6.	United Kingdom	82	68	6595
7.	Italy	80	44	6319
8.	Germany	70	47	5912
9.	Canada	53	37	4427
10.	Australia	43	33	3500

The below figure presents network visualization of the highly cited countries. Total nine clusters present the highly cited country. For visualization and citation count minimum number of documents and citation were selected at least 5 by country, 79 countries with 40 thresh hold it is visualized that United States was the most cited country with 56487 citations followed by China and Japan.

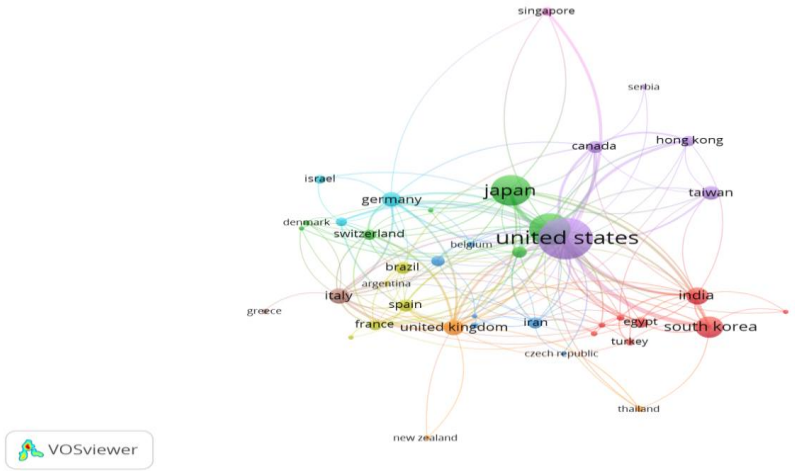

Figure 6: Visualization of highly cited countries

7. Top most Prolific Authors

Most prolific author based on their published articles in the field of Green Tea literature during the study year from 2002-2021. Minimum 150 authors

published their articles in Green Tea in which only top ten authors are presented in Figure 7. It is shows that Yang, C.S was most prolific author with 42 articles followed by Tachibana, H with 36 articles, Shen, C.L with 34 articles.

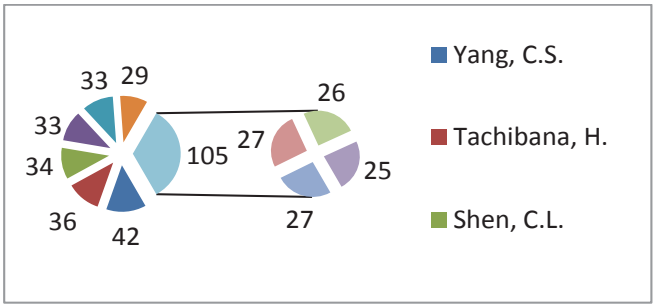

Figure 7: Top most Prolific Authors

8. Visualization of author keyword occurrences

Figure 8. shows the network visualization of author keyword occurrences on the literature of Green Tea. The map is created with the help of VoS viewer software. Total 12 clusters used in the visualization and each cluster shows the various keywords represent research area. Total 3924 keywords were taken in which 213 records meet the threshold for visualization. The minimum number of occurs of keyword was selected at 5. The occurrences of keyword can be seen by the circle. If the circle is big, it means the used of keyword in maximum times. In the figure Green Tea circle is bigger it means this term used in maximum times followed by egcg.

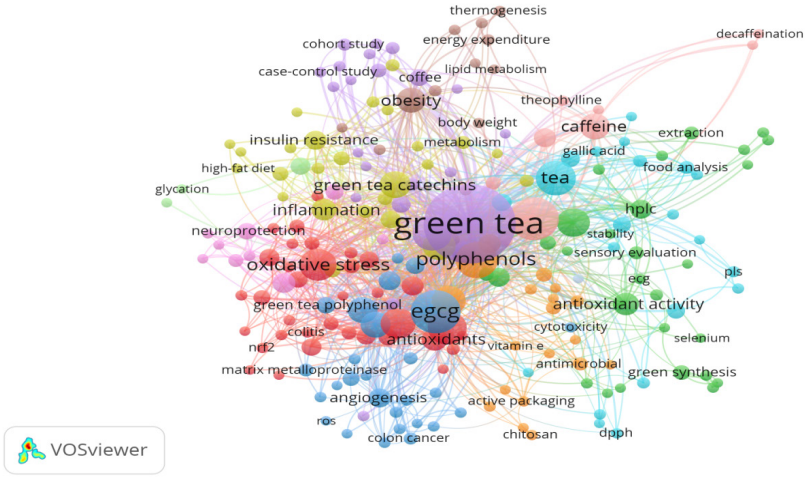

Figure 8: Visualization of author keyword occurrences

9. Productivity of journal in the field of Green Tea research

Productivity of journal based on their number of publications. Table 9. shows top ten most productive journals during the study period. It is observed that maximum 160 journals published the articles in the field of Green Tea. Food Chemistry was on top first with 169 publications followed by Journal of Agricultural and Food Chemistry with 164 publications.

Table 9: Productivity of journal in the field of Green Tea research

S.No.	Journal	Publication
1	Food Chemistry	169
2	Journal of Agricultural and Food Chemistry	164
3	Journal of Nutritional Biochemistry	74
4	Plos One	71
5	Molecules	67
6	Molecular Nutrition and Food Research	63
7	Tea In Health and Disease Prevention	58
8	Food Research International	55
9	Scientific Reports	46
10	Nutrients	44

Findings and Conclusion

This study is based on secondary data, collected data visualized with the help of VoS viewer software. Total 6509 data collected from Scopus database during the study year from 2002 to 2021. In this study author examined that year 2020 was most productive year. The least number of publications in the year 2002 with 126 articles. Maximum AGR found in 2013 with 20.11% followed by year 2019 with 10.46%. Beneficial Effects of Green Tea – A review is found highly cited articles with 1269 articles. English language is on top first followed by Chinese language. In Green Tea literature most of literature published in Medicine subject. In highly cited countries United States is highly cited country with 56487 citations and link with 245 countries. Yang, C.S observed most prolific author with 42 publications followed by Tachibana, H. with 36 publications during the study period. In the visualization of author keyword occurrences Green Tea keyword occurred in many times. In this Food Chemistry journal found most productive journal with 169 publications followed by Journal of Agricultural & Food Chemistry with 164 publications. This paper helps to various organizations, research authors who are engaged with this field. Future economic growth of any commodity is only depended on product

quality so this study gives a brief comprehensive on Green Tea quality, producing countries, funding agencies and best authors in this field.

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https://www.nccih.nih.gov/health/green-tea

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25

A Bibliometric Study of Global Publications on the Effect of Social Media in Libraries from 1991 to 2021

Avadhesh Kumar Patel & Dr. Kunwar Singh

Abstract

The paper presents a bibliometric study of global publications on the effect of social media in libraries from 1991 to 2021. A total of 736 scholarly publications were retrieved in the Web of Science database. This study recorded bibliometric information such as 24 publications per year, 3.03 citations per year on average, 10.83 per author, and 32.80 per publication. Abrizah A., the author, ranked first in terms with 8 publications. Each university has 18 publications, such as the University of California and the University of London. The United States led the list with 243 publications, while China came in second with 86. The majority of publications are in the form of articles (572) and English (690), while Spanish (25) and Portuguese (6). Emerald Group Publishing has the most publications (123), followed by Elsevier and Wiley, and each has 97 and 64 publications. The majority of the papers (230) had between 21 and 40 cited references. This study uses specific basic bibliometric measurements to demonstrate the value of literature on social media for improving library services.

Keywords: *Bibliometric, Social Media, Libraries, Web of Science, Publications.*

Introduction

The use of social media in the twenty-first century has had extraordinary consequences, perhaps more than any other generation before it. Information and communication technology is accountable for this effect. Libraries are not behind in terms of social media development, as it has become an integral and indispensable aspect of their services. Many libraries have put in place

information technology governance strategies to hasten the adoption of social media platforms and provide more convenient services to their patrons. Many libraries have social media profiles and offer services to their users (Adetayo and Williams-ilemobola, 2020; Ebrahim (2020).

In recent years, the use of social media has boosted dynamic pricing (Pew Research Center, n.d.). Social media platforms can support goods and provide information to improve library services successfully and encourage positive behavior change among those impacted by information (Coiera, 2013; Anyira and Udem, 2020). Academic libraries have found a way to enhance their facilities using social media (SM), which is one of the most current technological advancements that has been incredibly popular in recent years. Libraries, as social institutions, use social media, a product of advanced technology, to strengthen their ties with their patrons (McCallum, 2015; Adetayo and Williams-ilemobola, 2020). According to the latest United Nations projections compiled by Worldometer, there are over 7.9 billion people worldwide as of October 2021 (Worldometer, n.d.). The latest data shows that 4.48 billion social media users worldwide in 2021, equating to almost 57 percent of the global population (DataReportal, n.d.). Many social media platforms likeFacebook, Twitter, YouTube, Instagram, Skype, WhatsApp, and others and specific social networking sites. As a means of disseminating information through the internet, social media is rapidly improving all library and information services elements. In addition, it has been found that social media is increasingly becoming the preferred medium for creating social/professional networks among library professionals. To communicate with future library users and provide comprehensive information services to other remote users, particularly academic libraries (Quadri and Adebayo 2016).

This research is based on a bibliometric analysis of advanced library services influenced by social media, an information and communication technology product.

Related Work

Bibliometrics is a type of study that examines bibliographic content using mathematical tools (Broadus, 1987). In 1969, Pritchard coined the term "bibliometric analysis". The traditional bibliometric methods usually highlight citation, productivity, and content analysis (Zupic and Čater, 2015). The emerging bibliometric network analysis often analyzes the relationships between keywords (Ding et al., 2001), countries (Bonilla et al., 2015), research institutes (Coupé, 2003), and authors (Van Eck andWaltman, 2008). These are the most popular indicators for a database of bibliographic documents. Many bibliometric studies have been exploring the research pattern and developments in various fields.

Noor et al. (2020) conducts a bibliometric analysis of social media as a platform for knowledge management. This study revealed that the USA and England were top-ranked collaborative countries and most productive institutes as the Tampere University of Technology. Zyoud et al. (2018) convened the bibliometric study of global trends of social media research in psychology. It found that 959 publications from the Web of Science, the USA also topped with 57.14% of the total publications. In this study, Articles are favorable with the English language.

There are many bibliographic studies carried out by various researchers in various disciplines, Su et al. (2020); Macro et al. (2021); Mamdapur and Gupta (2021); Karisiddappa et al. (2020); and Silva, R. F. da, and Martha de Souza, G. F. (2021), etc.

The researchers have looked at the essential bibliometric indicators for global literature on the effect of social media in libraries in this study. Yearly trends, average measures, collaborative measurements, cited references, form, and language distribution are all included in this paper.

Research Questions

- RQ1: What are the summaries of bibliometrics details of the study?
- RQ2: What is the pattern of publication over time?
- RQ3: Who are the most prolific authors, institutions, and countries when it comes to publishing?
- RQ4: Who are the most well-known publishers in this field?
- RQ5: What are the average and trending numbers of citing references in a publication?

Methodology

This study performed the bibliometric analysis of global literature on the effect of social media in libraries from the Web of Science (WoS) citation database. Thomson Reuters corporationdeveloped it, is the world's most comprehensive and extensive collection of information resources (Xie et al., 2020). A topic search was performed using the keyword "(TS= (Social Media in Library)) OR TS= (effect of Social Media in Libraries)" to obtain published literature in the database. It extracted the documents on the Effect of Social Media in Libraries. The search was carried out on October 12, 2021. It found 736 documents that were downloaded in ".txt" format for analysis. MS-excel and Google sheet was used for more interpretive network visualization of keywords, journals, publications, authors, and countries. The study's step-wise workflow is given below in Figure 1 (Rai et al. 2020).

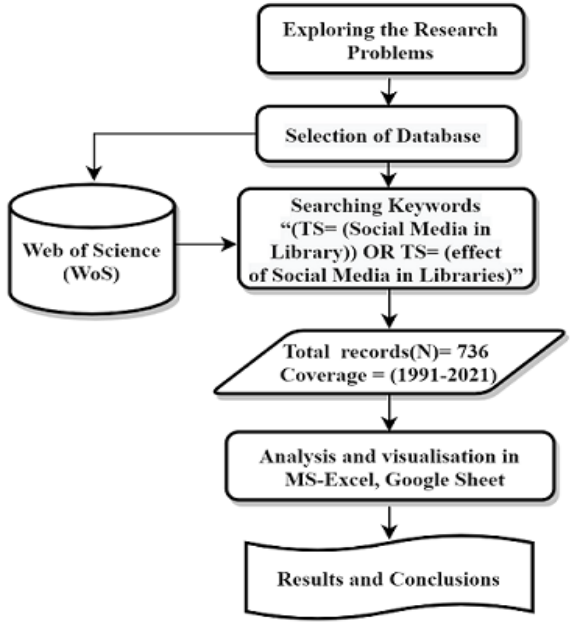
Exploring the Research Problems
Selection of Database
Web of Science (WoS)
Searching Keywords "(TS= (Social Media in Library)) OR TS= (effect of Social Media in Libraries)"
Total records(N)= 736
Coverage = (1991-2021)
Analysis and visualisation in MS-Excel, Google Sheet
Results and Conclusions

Figure 1: Workflow of the present study

Results and Discussion Summary of Bibliometric Information

Table 1 shows a descriptive summary of bibliographic details. There are 736 publications in all, including 185 single-authored articles and 551 multiple-authored documents. The average number of citations per publication is 10.83, and the average number of citations per document each year is 1.10. Bibliometric details include citation analysis patterns and a systematized approach to the processing data repository (Thompson and Walker, 2015).

Table 1: Summary of bibliometric information

Details	Observed value
Total no. of publication	736
Coverage	1991-2021
Total no. of authors	2229
Total no. of citations	24136
Average publication per year	24
Authors per publication	3.03
Average citation per author	10.83
Average citation per publication	32.80
Total cited references	36200

P-T Graph for Publication Pattern

The measuring of development of the publication on the effect of social media in libraries is shown by the P-T graph in figure 2. This figure shows an increasing pattern of publication growth over time with slight fluctuation. In the year 2020, the maximum number of publications is 109. The average number of publications per year, as per the P-T graph, is 24. The publication trend has been steadily increasing since 2009, with some fluctuations in 2014 and 2016.

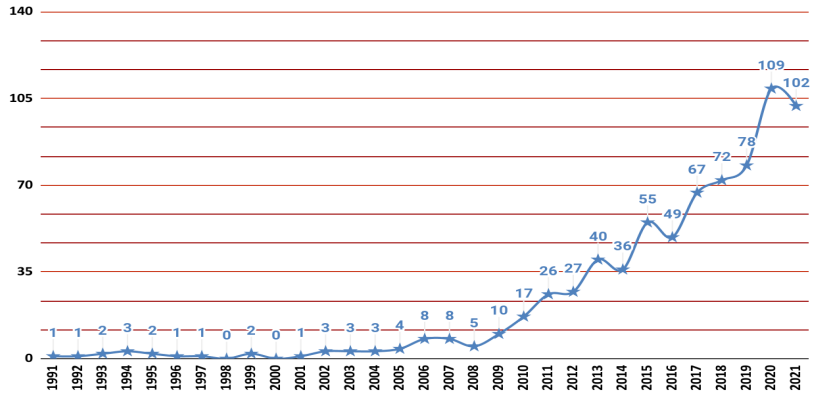

Figure 2:

P-T Graph: Publications Pattern over time

Top Ten Collaborators

The bibliographic study highlights the most collaborative authors, institutions/organizations, and countries. The author, Abrizah A., topped the list with 8 publications, whereas Chen, Y., Chiu, DKW., and Zhang, Y. are the ones who have contributed the second-highest number of publications, 6 each**.** Figure 3 shows the top contributing authors to the global "Effect of Social Media in Libraries" research during 1991-2021. Out of the total 2229 authors, only 146 authors have greater than two publications, while the remaining authors have only 1 publication each. The 949 organizations contributed random numbers of publications of the study. Figure 4 shows the top ten highly contributive institutions/organizations. In this figure, the University of California and London contributed the highest 18 publications each. They were followed by the Pennsylvania Commonwealth System of Higher Education (PCSHE) with 16 publications, Wuhan University with 15 publications, and others. Out of the total institutions,704 institutions contributed one publication each, 204 institutions gave 2 to 5 publications each, and 41 institutions contributed 5 to 8 publications each. Exploring by countries, out of the total 77countries, the United States topped with 243 publications, nearly 3 times more than China,

which is second in the list with 86 publications, followed by England and Australia with 78 and 61 publications respectively. Figure 5 shows the top twenty contributing countries with their geographical picture by corresponding colors. The other 57 countries have less than or equal to 10 publications. India appears on the list of the 20 most contributing countries with 15 publications.

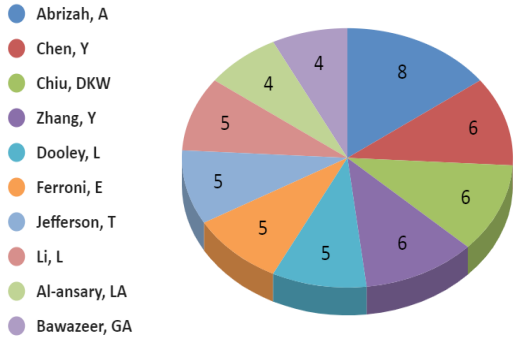

Figure 3: Top collaborative authors

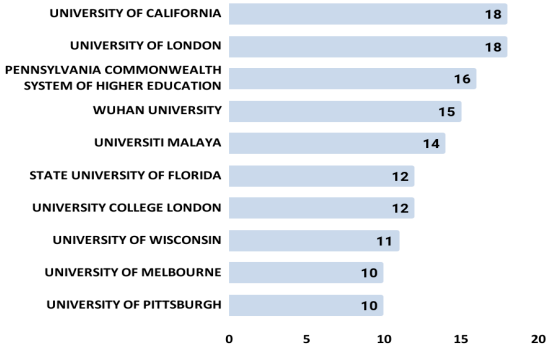
UNIVERSITY OF CALIFORNIA 18
UNIVERSITY OF LONDON 18
PENNSYLVANIA COMMONWEALTH SYSTEM OF HIGHER EDUCATION 16
WUHAN UNIVERSITY 15
UNIVERSITI MALAYA 14
STATE UNIVERSITY OF FLORIDA 12
UNIVERSITY COLLEGE LONDON 12
UNIVERSITY OF WISCONSIN 11
UNIVERSITY OF MELBOURNE 10
UNIVERSITY OF PITTSBURGH 10
0 5 10 15 20

Figure 4: Top contributing Institutions

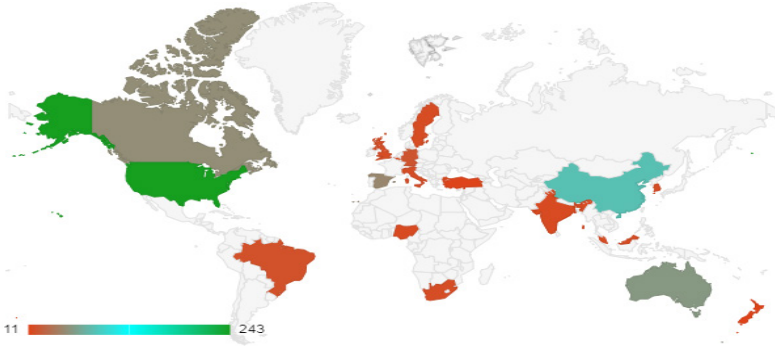

Figure 5: Geographical map of top contributing Countries

Form and Language-wise Analysis

Table 2 depicts the list of forms and language-wise analysis of the publications. The table shows that the primary form of publication is articles with 572 publications, followed by review papers with 141 publications. The other forms of publications are early access, proceedings papers, editorial materials, and book reviews. English has 93.75 percent of the total of publications alone in the synthesis of language. English has a higher speaking geographical area followed by Spanish with 25 publications, Portuguese with 6 publications, and others are shown in the table. Estonian, Italian, Japanese, and Russian languages have 1 publication each.

Table 2: Form and Language wise analysis of publications

Document Type	Documents	Language	Documents
Articles	572	English	690
Review Papers	141	Spanish	25
Early Access	28	Portuguese	6
Proceedings Papers	15	German	5
Editorial Materials	12	French	3
Book Reviews	11	Turkish	3

Top Ten Publishers

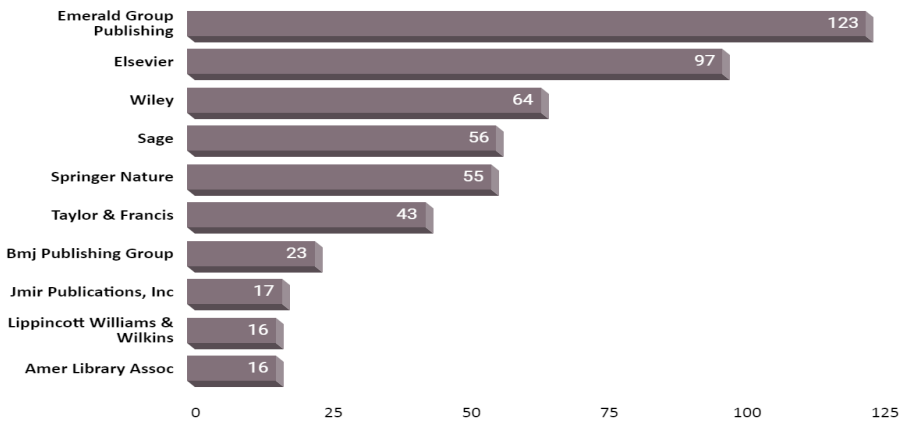

Figure 6: Top ten publishers

Figure 6 shows the list of the top ten publishers of the research publications of this study. These significant publishers have published over 70% of all publications, while others have only 30%. In the figure, Emerald Group

Publishing has the highest number of publications, published 123 publications, followed by Elsevier and Wiley with 97 and 64publications, respectively. The Sage and Springer Nature publishers have approx similar publications (56 and 55, respectively). The top publishers' scope is multidisciplinary subject areas, including library and information science discipline.

Cited references

Figure 7 shows the patterns of cited references in the publications of the study. There are some cited references groups in the figure, which shows the number of publications that have cited references groups. Of the 736 total publications, 127 publications have up to 20 references, while 21 to 40 references are found in 230 publications. It hasthe highest number of publications, while the average number of cited references per document is 49 references. Six publications have greater than 200 cited references.

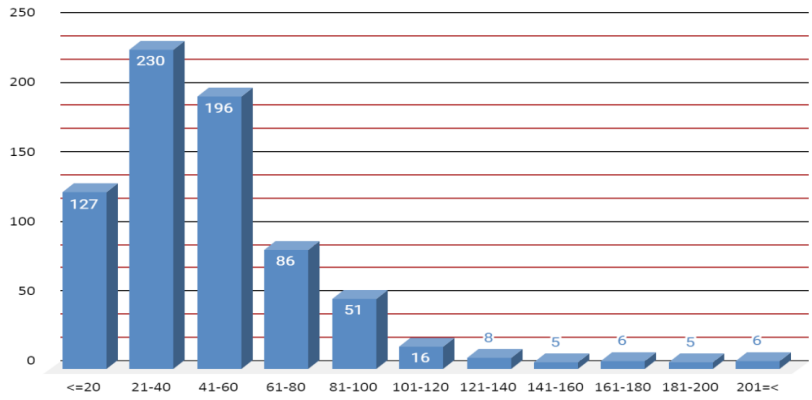

Figure 7: Cited references

Conclusion

The global literature on the impact of social media in libraries was examined in this study. The researchers discovered that out of 736 scientific articles, 551 are multi-authored, whereas 185 are single-authored. The publication patterns are increasing through time, with volatility, and 2020 will have the 109th highest publication. The 2229 authors contributed to the global literature research. The author, Abrizah A., topped the list with 8 publications, followed by Chen, Y., Chiu, DKW., and Zhang, Y.6 publications each. The 949 organizations contributed random numbers of publications. The University of California and London have 18 publications each, followed by the Pennsylvania Commonwealth System of Higher Education (PCSHE) with 16 publications and Wuhan University with 15 publications. Out of the total 77

contributing countries, the United States topped with 243 publications, China second in the list with 86 publications, followed by England and Australia with 78 and 61 publications, respectively. The majority of publications are found as articles forms (572) and English language (690), followed by Spanish (25), Portuguese (6). The top ten publishers have published nearly 70 percent of the total publications out of the total publishers. Emerald Group Publishing has the highest 123 publications, followed by Elsevier and Wiley with 97 and 64 publications. The Sage and Springer Nature have approx similar publications 56 and 55, respectively. The majority of papers (230) had 21-40 cited references, with 196 publications having 41-60 cited references. The average number of cited references is 49 references.

This study shows the importance of social media for improving the services of libraries. Social media have advanced facilities for disseminating, distributing information among the social community. The future inclusions of social media are involved in all domains like libraries. The interested researchers work further in this domain as the advancement of social media and libraries.

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26

Global Research Productivity on Blood Cancer: A Bibliometric Study

Komal Kirad, Dr. Mahender Pratap Singh & Neelu Meena

Abstract

This study deals with the Global Research productivity on Blood Cancer during the period of 2012-2021. 4329 articles were collected from the Scopus database. This study examines the year wise distribution, most productive journals and authors, language and subject wise distribution. The data have been analysed through Microsoft excel sheet and visualisation with VoS viewer software.

Keywords: *Bibliometric, Blood Cancer, Scopus.*

Introduction

Bibliometric is the use for statistically analyse articles, books and other publication. Firstly, Alan Pritchard introduced the word 'Bibliometric' in 1969. Bibliometric studies useful for the annual growth of literature, measure the productivity of Author and Journals.

This study shows a Bibliometric study in the field of Blood Cancer during the period from 2012 to 2021. Blood Cancer is a serious disease related to blood, also known as Leukemia. It is affected bone marrow, when white blood cells are damaged, Blood Cancer develops. Cancer cells grow in the bone marrow. it can affect person of any age. The exact cause of Blood Cancer in not yet known but some factors have been identified. This includes:

1. Family history of Leukemia
2. Smoking
3. Genetic disorders, Down Syndrome, Fancomi Anemia.
4. Cancer treatment with chemotherapy or radiation therapy

5. Blood disorders, such as melody plastic syndrome, sometimes called 'Preleukemia'
6. Exposure to chemicals such as benzene
7. Exposure to high levels of radiation

Objectives of the Study

1. To find out the year wise distribution in Blood Cancer.
2. To find out most productive authors.
3. To identify the language and subject wise distribution.
4. To identify the ranking of countries in Blood Cancer literature.
5. To examine the highly cited journal in the field of Blood Cancer.
6. To identify author keywords occurrence of Blood cancer.

Research Methodology

For data collection Scopus database was used. For this bibliometric study total 4329 document rectified during the study year from 2012 to 2021. Author used this query in Scopus database TITLE (blood AND cancer) AND PUBYEAR>2012 AND PUBYEAR<2022. Microsoft Excel and VoS viewer is used for data analysis and graphical presentation of data.

Review of Literature

(Seo, Kim, Kim, & Lee, 2020) analyzed articles published by the Web of Science Core Collection (WoSCC) on Acute Myeloid Leukemia (AML) from 1999 to 2018 and found 48202 papers on AML, making them the most research paper in blood and university. Written by scientists at the MD Anderson Cancer Canter in Texas. Most of the research articles on leukemia were written by the United States during this period and there has been increasing in China at this time.

(Yeshwant & Ravi, 2016) conducted a scientometric study on blood cancer under the title "Scientific Dimensions of Blood Cancer Research". This study showed that in 2004–2014 there were a total 1936 publications in countries in South Asia, in which only 4 countries (India, Pakistan, Bangladesh and Nepal) published 50% of the total and the highest 1731 publications were published by India. That data collected by PubMed database.

(Hadimani, Mulla, & Kumar, 2015)concluded a bibliometric analysis on blood cancer in India. From that study it was found that 52014 scientists from India have authored 15794 research publications on blood cancer in the period of 2003 to 2013. The year 2013 has the highest number of publications at 2996,

author productivity rate is 0.31, the most preferred journal is the Asian Pacific Journal of Cancer Prevention and the most cited research publication is The Lancet journal article published by Elsevier Publications. CSIR ranked top in cancer research publications.

(Moodley, Singh, Kagina, Abdullahi, & Hussey, 2014) authors added to their bibliographic study all English articles published in 2004–2014 on cancer research in South Africa. Some journal databases such as PubMed, SCOPUS, Web of Science and EBSCO are used to collect the data. In this, Boolean operators AND & OR has been used for data search.

(Kavitha, Dhanavandan, & Kavitha, 2013) did a bibliometric study on 3078 research papers covered by the PubMed database on pediatric blood cancer from 2008 to 2012, in which they observed that research on pediatric blood cancer is being conducted only by centres in the United States and only one Language, the research paper is being published in English.

Data Analysis and Interpretation

Total 4329 documents have rectified from Scopus database the study period from 2012-2021. Extracted data is interpreted and calculated on the basis of objectives.

1. Year Wise Distribution

Year wise distribution of publication on Blood Cancer has been presented in table-1 and figure no.-1.

Table 1: Year wise distribution

S.N.	Year	Number of Publication	Percentage
1	2021	488	11.27
2	2020	564	13.02
3	2019	487	11.24
4	2018	431	09.95
5	2017	470	10.85
6	2016	419	09.67
7	2015	398	09.19
8	2014	393	09.07
9	2013	355	08.20
10	2012	324	07.48
TOTAL		4329	

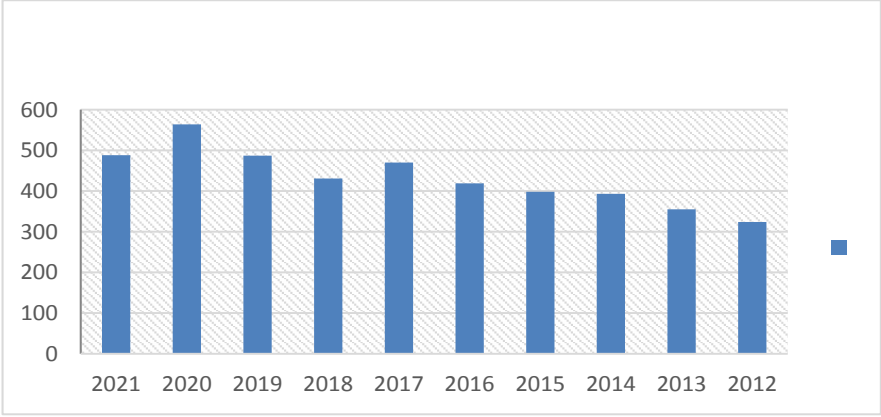

Figure 1: Year wise publication

Figure 1 describe year wise publication. The most productive year was 2020 with 564 Article and the least number of publication year was 2012 with 324 Article.

2. Author wise distribution of publication on Blood Cancer literature during the year from 2012-2021

Author wise distribution of publication on blood cancer 4329 publication during the study of year. Top ten author data have been presented on table 2 and figure no. 2.

Table 2: Author wise publication

S.No.	Author Name	Number of Publication
1	Brenner, H.	16
2	Young, G.P.	14
3	Wu, X.	13
4	Pantel, K.	12
5	Vineis, P.	12
6	Zhao, Y.	12
7	Andergassen, U.	11
8	Giles, G.G.	11
9	Liu, Y.	11
10	Lund, E.	11

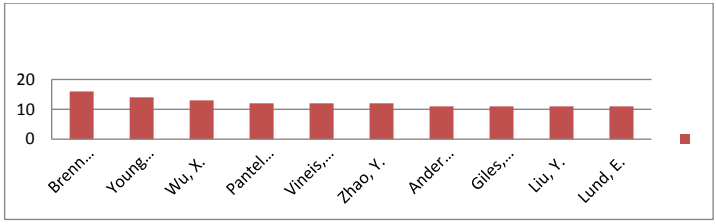

Figure 2: Author wise publication

Figure 2 shows author wise publication on blood cancer literature. It is observed that Brenner, H. has written maximum number of articles.

3. Language wise distribution of publication on Blood Cancer literature during the year from 2012-2021.

Table 3: Language wise distribution of publication

S.N.	Language	No. of Article
1	English	3991
2	Chinese	184
3	Russian	60
4	German	36
5	Japanese	22
6	Spanish	18
7	French	16
8	Persian	11
9	Czech	8
10	Dutch	4

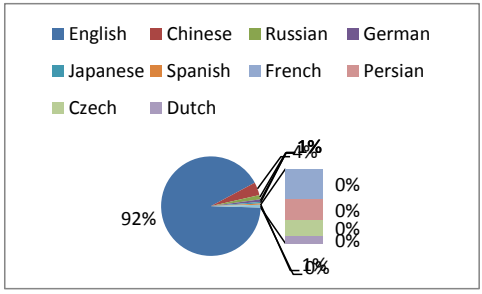

Figure 3: Language wise distribution of publication

Figure no. 3. describe the language wise distribution minimum number of articles published in Dutch language and maximum number of articles published in English language.

4. Subject wise distribution of publication on Blood Cancer literature during the year from 2012-2021

Table 4: Subject wise distribution on Blood Cancer

S.No.	Subject	Number of Article
1	Biochemistry, Genetics and Molecular Biology	1897
2	Chemistry	217
3	Chemical Engineering	138
4	Computer Science	114
5	Agricultural and Biological Sciences	106
6	Dentistry	11
7	Arts and Humanities	5
8	Decision Sciences	5
9	Business, Management and Accounting	4
10	Earth and Planetary Sciences	4

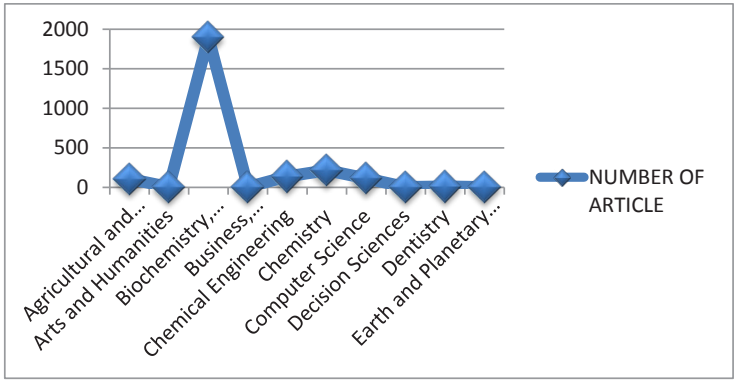

Figure 4: Subject wise distribution on Blood Cancer

Figure no.4. describe the subjectwise distribution minimum number of articles published in Business, Management and Accounting and Earth and Planetary Sciences subject. The maximum number of articles published in Biochemistry, Genetics and Molecular Biology subject.

5. Country wise distribution of publication on Blood Cancer literature during the year from 2012-2021

Table 5: Country wise publication on Blood Cancer

S. N.	Name of Country	Number of Article
1	China	974
2	United States	887
3	Germany	293
4	United Kingdom	269
5	Japan	245
6	Italy	199
7	France	138
8	Russian Federation	133
9	India	130
10	Canada	126

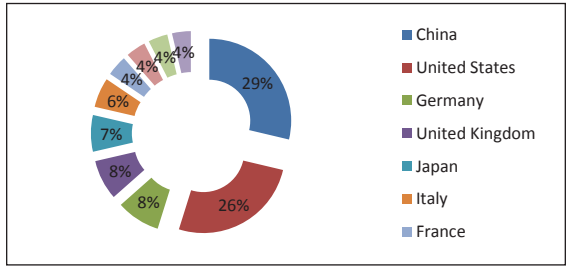

Figure 5: Country wise publication on Blood Cancer

Figure 5. shows country wise publication on blood cancer in China was most productive country with 29% Articles and second position was United States with 26% Articles. India has 8% Articles.

6. Highly cited journal Blood Cancer literature during the year from 2012-2021

Table 6: Highly cited journal in the field of Blood Cancer

Name of Journal	Number of Citation
New England Journal of Medicine	1559
Nature Reviews Clinical Oncology	1022
Science	972
Nature Biotechnology	674
Cancer Prevention Research	633
Nature Medicine	516
Nature Medicine	480
Pharmaceutical Research	456
Cancer Discovery	422
Cancer Cell	393

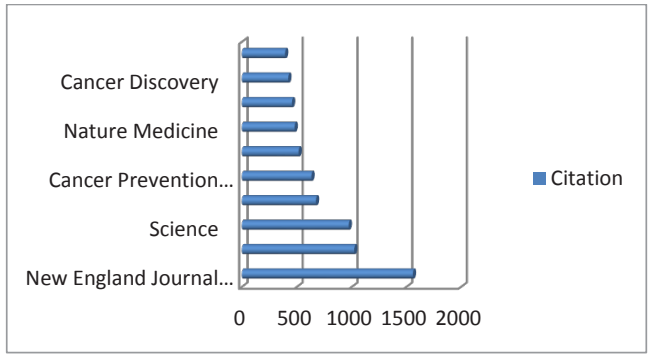

Figure 6: Highly cited journal in the field of Blood Cancer

Figure 6. shows highly cited journal during 2012 to 2021 most highly cited journal is New England Journal of Medicine with 1559 number citation.

7. Visualization of Author keyword occurrence

Figure 7. describes the network visualization of author keyword occurrences on literature of Blood Cancer. The chart is created with the help of VoS viewer software. Total 11 cluster used in the visualization and each cluster shows the various keywords represent research area. Total 2946 keywords were taken in which 194 items meet the threshold for visualization. The minimum occurs of keyword was selected at 5. The occurrences of keyword can be seen by the colourful spots. If the spot is big in size, it means the used of keyword in maximum times. In the map Colorectal Cancer spot is bigger it means this term used in maximum time followed by Breast Cancer.

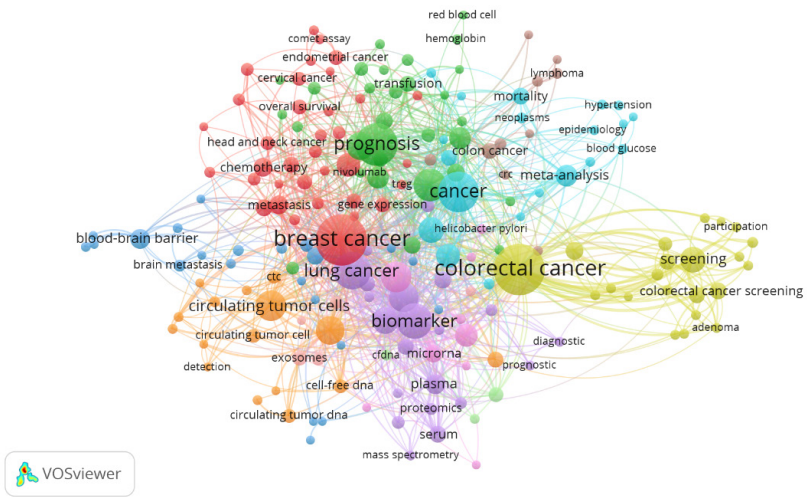

Figure 7: Author visualization of keyword occurrence

Findings

In this study 4329 data were collected from Scopus Database during 2012-2021. Authors were revealed that year 2020 found most productive year with 564 publications and the least number productive year is 2012 with 324 publications on blood cancer. Brenner, H. has highest with 16 publications. China is most productive country which have published maximum number of article (974 article) in 2012 to 2020. India has 130 publications on blood cancer. Highly cited journal found New England Journal of Medicine with 1559 number of citations. In visualization of author keyword occurrence Colorectal Cancer keyword occurred in many times. This paper helps in cancer institutes and research authors who wants to research in this particular field. Cancer is dangerous disease; people are battling in it also Surrounding people and families are also suffering for affected person. This study will be benefits for cancer institute and research centres, researchers and medical professionals. It will be easier for the researchers to find the available data.

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Neelu Meena, she has completed B.Sc. from Maharani College, Jaipur. BLIS and MLIS from Department of Library and Information Science in University of Rajasthan and also, qualified the National Eligibility Test conducted by National Testing Agency.

27

Global Research Trends on Open Science during 2012-2021: A Bibliometric Analysis

Isha Arya, Dr. Mahender Pratap Singh & Pratibha Prajapati

Abstract

The study aims at examining the global research output on Open Science during the year 2012-2021 and total 1725 records have been extracted from the Scopus database. The number of publications has been decreased from 2020 to 2021. In subject-wise distribution, Social Science was on top with 593 publications whereas Computer Science with 526 publications. United State was on lead with 521 publications, followed by United Kingdom with 240 publications. This study used VOS Viewer software for visualization.

Keywords: *Open Science, Bibliometric Analysis, Scopus, VOS Viewer.*

Introduction

Open Science is a new approach to scientific process. It promotes new ways of knowledge diffusion with the use of latest technology and collaborative tools. The term Open Science refers to the movement that makes scientific research and data accessible to the whole society. It deals with the principles of openness to the whole research cycle that fosters sharing, transparency and collaboration. Open science changed the traditional way of doing research. It is not yet fully adopted by academicians. Open Science is an umbrella term that incorporates various terms such as open access, open peer review, citizen science, open data, open educational resources, open source, that aiming to make research as well as data accessible to all by removing barriers at all levels.

Therefore, bibliometric study has been conducted to analyse the growth and development trend in the field of Open Science literature. The term

Bibliometrics coined by Alan Pritchard in 1969 to measure the productivity of the literature by applying mathematical and statistical tools. This paper is an attempt to analyse the growth and productivity of Open Science literature with the help of bibliometric tools.

Review of Literature

McKiernan et al. (2016) reviewed the published works on Open Science and examined how researchers succeed while using open science practices. This article ascertained various benefits of Open Science practices such as increase in citations, job opportunities, potential collaborators, more media attention, etc. Onyancha (2016) conducted bibliometric analysis on the status of Open Researcher Data sharing among researchers of Sub-Saharan Africa. The author extracted the data from Data Citation Index (DCI) for the years 2009 to 2014. Findings of the study shows that South Africa was on the lead with 539 data records in DCI, followed by Kenya. Analysis of the study found that universities and research institutions are the major contributors of research data. (Singh et al., 2021) presented a bibliometric analysis on Green Economics during the study period from 2012-2021 and total 6,514 documents retrieved from the Scopus database. Year 2020 was the most productive year with 980 publications and maximum AGR was observed in 2020 with 16.53 and minimum AGR was observed -4.15. China was on top with 1771 publications and 1833 citations among countries.

Objectives:

1. To assess year wise addition, author wise contribution, subject wise and country wise distribution of Open Science publications.
2. To examine the yearwise growth rate of Open Science.
3. To determine highly cited articles in Open Science literature.
4. To visualize the author keyword occurrence in publications of Open Science.

Methodology

Scopus is an abstracting and indexing database from Elsevier. It was used by the researcher to extract the data for the year 2012-2021 and a total of 1725 records were retrieved on 31.10.2021. The following search query used to extract the data on Open Science: "TITLE (open AND science) AND PUBYEAR > 2011 AND PUBYEAR < 2022." The researcher used MS Excel for data analysis and graphical representation and VOS Viewer software for visualization.

Data Analysis and Interpretation

Year-wise Distribution of Publications

Figure 1. shows the year wise distribution of publications on Open Science during the last ten years from 2012 to 2021. It is clear from the figure that number of papers increased over time. The maximum number of publications was recorded during the year 2020 with 281 articles, followed by 264 articles in 2019 and 256 papers in 2018. It is observed that there was a huge increase in the number of papers between the years 2016-2018. The year 2013 recorded minimum number of publications with only 70 papers during the last ten years. There was a decrease in number of publications in the year 2021 as compared to 2020.

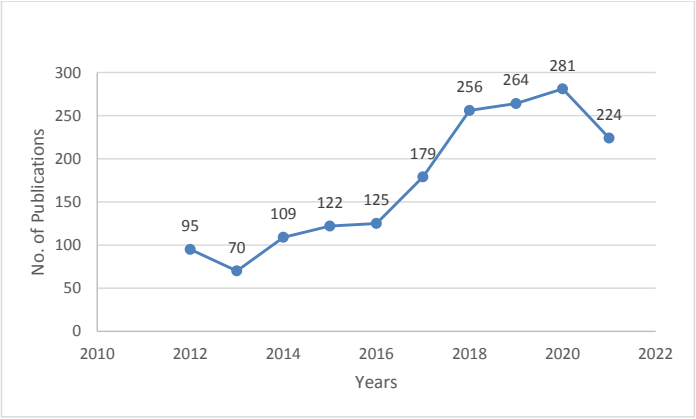

Figure 1: Year-wise Distribution of Publications

Annual Growth Rate, Relative Growth Rate and Doubling Time of the Publications on Open Science

Table 1: Annual Growth Rate, Relative Growth Rate and Doubling Time of the Publications on Open Science

Year	Initial Value (W1)	End Value (W2)		AGR	RGR	DT
2012	0	95	95	Not define	4.55	0.15
2013	95	70	-25	-26.32	4.24	0.16
2014	70	109	39	55.71	4.69	0.15
2015	109	122	13	11.93	4.8	0.14
2016	122	125	3	2.46	4.82	0.14
2017	125	179	54	43.20	5.18	0.13

Year	Initial Value (W1)	End Value (W2)		AGR	RGR	DT
2018	179	256	77	43.02	5.54	0.13
2019	256	264	8	3.13	5.57	0.12
2020	264	281	17	6.44	5.63	0.12
2021	281	224	-57	-20.28	5.41	0.13

Table 1 reveals that maximum AGR is count in 2014 with 55.71 and minimum AGR in 2021 which is -20.28. Table also highlights highest RGR is 5.63 in the year 2020 and lowest in 2013 with 4.24. Maximum doubling time in 2013 is 0.16.

Author-wise Distribution of Publications

Figure 2. depicts the author-wise distribution of publications on Open Science literature of top ten authors only during the last ten years. It is observed that both Manghi, P. and Ross, J.S. have written maximum number of articles (NP=10), followed by Joly, Y. with 7 publications and four authors have 6 publications.

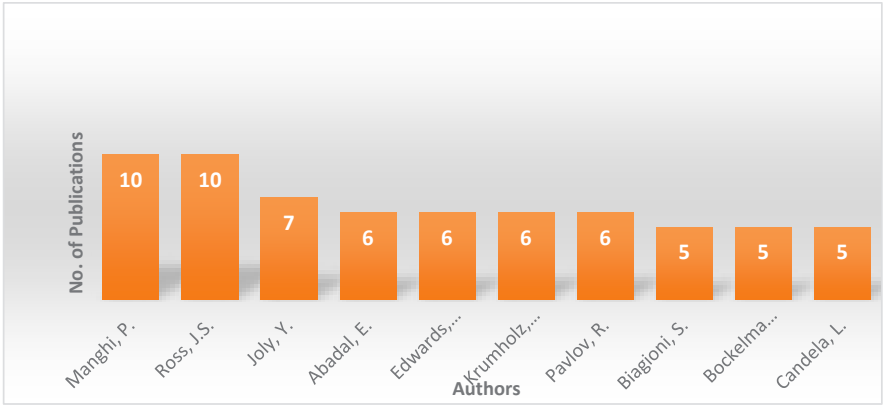

Figure 2: Author Wise Distribution of Publications

Subject-wise Distribution of Publications

Figure 3. displays the subject-wise distribution of publications on Open Science literature of the top ten subjects only. From the figure, it is clear that "Social Science" subject has maximum publications with 593 articles, followed by computer science, medicine and engineering. Mathematics was observed least number of publications with 106 articles.

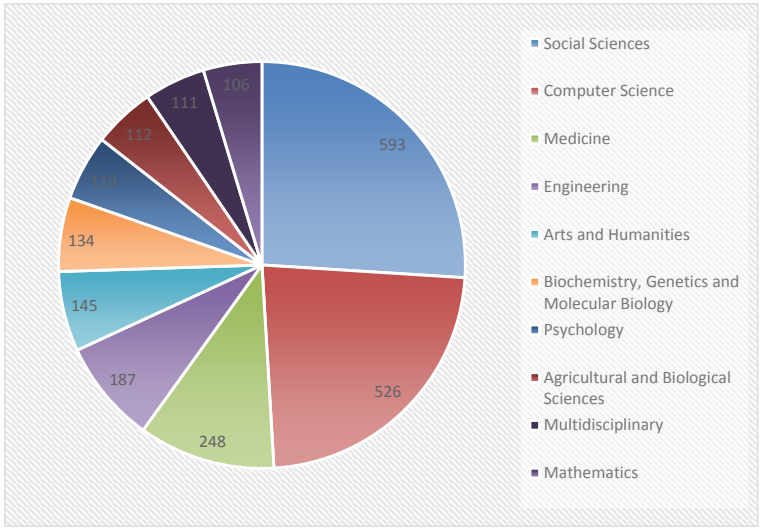

Figure 3: Subject Wise Distribution of Publications

Country-wise Distribution of Publications

Figure 4. clearly shows the top ten countries' contributions to the publications on Open Science literature during the year 2012-2021. It is observed that the United States has maximum publications with 521 articles, followed by United Kingdom (NP=240), Germany (NP=159), Canada (NP=112) and Italy (NP=111). Japan has the least number of publications with 58 articles.

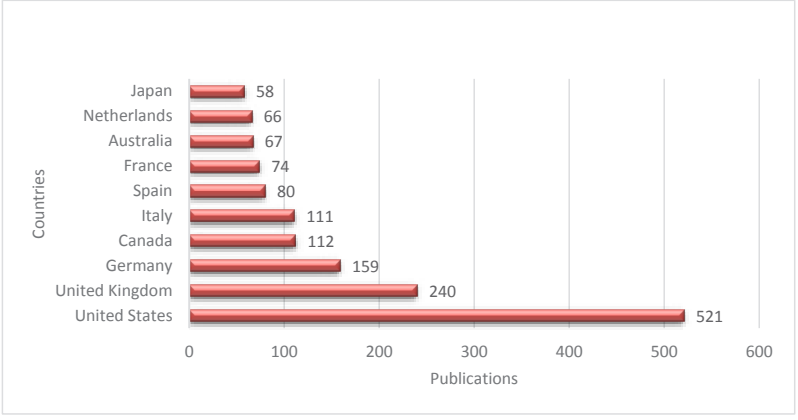

Figure 4: Country Wise Distribution of Publications

Highly Cited Articles on Open Science

Table 2. reports the top ten highly cited articles on Open Science literature and "The Astropy Project" is on the top with 1339 citations followed by

OpenSeasame with 977 citations. Article on "An open science resource for establishing reliability and reproducibility in functional connectomics" has the least number of citations.

Table 2: Highly Cited Articles

S. No.	Title	Authors	Citation
1.	The Astropy Project: Building an Open-science Project and Status of the v2.0 Core Package	Price-Whelan, A.M., Sipõcz, B.M., Günther, H.M., (...), Woillez, J., Zabalza, V.	1339
2.	OpenSesame: An open-source, graphical experiment builder for the social sciences	Mathôt S., Schreij D., Theeuwes J.	977
3.	New Basis Set Exchange: An Open, Up-to-Date Resource for the Molecular Sciences Community	Pritchard B.P., Altarawy D., Didier B., Gibson T.D., Windus T.L.	393
4.	The death of the Job plot, transparency, open science and online tools, uncertainty estimation methods and other developments in supramolecular chemistry data analysis	Brynn Hibbert D., Thordarson P.	315
5.	An open, large-scale, collaborative effort to estimate the reproducibility of psychological science	Alexander, A., Barnett-Cowan, M., Bartmess, E., (...), Van'T Veer, A., Vianello, M.	315
6.	Open access: The true cost of science publishing	Van Noorden R.	252
7.	Crowd science: The organization of scientific research in open collaborative projects	Franzoni C., Sauermann H.	251
8.	How open science helps researchers succeed	McKiernan, E.C., Bourne, P.E., Brown, C.T., (...), Woo, K.H., Yarkoni, T.	232
9.	Scalable Open Science Approach for Mutation Calling of Tumor Exomes Using Multiple Genomic Pipelines	Ellrott, K., Bailey, M.H., Saksena, G., (...), Aredes, N.D., Mariamidze, A.	213
10.	An open science resource for establishing reliability and reproducibility in functional connectomics	Zuo, X.-N., Anderson, J.S., Bellec, P., (...), Zhu, X.-T., Milham, M.P.	212

Keyword Occurrence

Network visualization of the author keyword occurrence has shown in figure 5. which is created with the help of VOS Viewer software. There is a total of 3016 keywords taken in which 109 records meet the threshold for visualization. As the figure depicts that the cluster of Open Science (Colour: purple) has the bigger circle that means it is the maximum used author keywords in the articles, followed by open access.

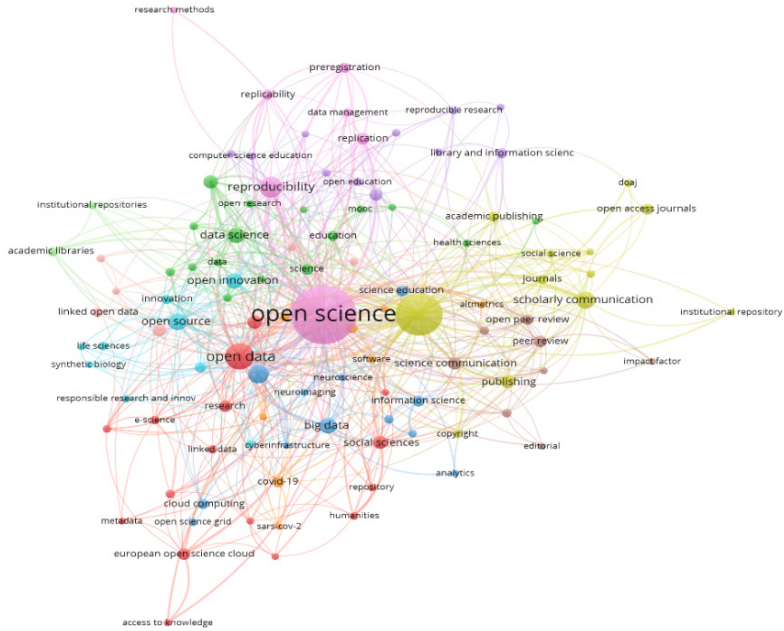

Figure 5: Keyword Occurrence

This paper is an attempt to ascertain the trends existing globally from 2012-2021 covering a spam of a decade. Data has been carefully arranged and shown in figures and tables to place information in terms of year wise publication, authors contributing in the field, subject-wise articles and papers have been written in, and even in terms of their being cited by scholars in their works. Researcher found that year 2020 most productive year with 281 publications. In this study, researcher used VOS Viewer software for visualization in which author keyword taken and found 'Open Science' has highly used keyword which is followed by 'Open Access'. Manghi, P. and Ross, J.S. both are on top ranked authors. 'The Astropy Project: Building an Open-science Project and Status of the v2.0 Core Package' is found highly cited articles during the study period. Hope this paper puts into perspective all trends prevalent in open science to augment and foster great increase in this field as well as awaring scholar community at large of this fast-growing field.

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Research Trends in Epilepsy: A Scientometric Analysis

Dr. Vijaykumar B. Gopale & Dr. V.T. Kamble

Abstract

The present paper tries to analyse the growth and development pattern of Epilepsy research based on the publication output from 2002-2016 using the data retrieved from Jgate Plus. A total of 54435 records were analysed to find out the year wise productivity, country wise distribution, most productive journals, most productive author, subject wise scattering of epilepsy research and scientific productivity of Indian authors. India stands 5th position in the production of epilepsy research and United states of America is found to be the highest productive country with 19273 papers.

Keywords: *Epilepsy research, Scientometric analysis, H index, SJR*

Introduction

Epilepsy

Epilepsy is a chronicle disorder that causes unprovoked, recurrent seizures. A seizure is a sudden rush of electrical activity in the brain. Epilepsy is a fairly common neurological disorder that affects 65 million people around the world. In the United States, it affects about 2 million people. Any one can develop, but it is more common in young children and older adults. It occurs slightly more in males than in females. There is no cure for epilepsy, but the disorder can be managed with medications and other strategies. (Healthline.com) [1]

Epilepsy affects all age groups. But for children a variety of issues exist that can affect one's childhood. Some epilepsy ends after childhood. Some forms of epilepsy are associated only with conditions of childhood that cease once a child grows up. Approximately 70% of children who have epilepsy during their childhood eventually grow it. There are also some seizures such as febrile seizures, that are one-time occurrences during childhood and they do not result in permanent epilepsy. Pediatric epilepsy may cause changes in the development of the brain. For this reason, epilepsy in children is vastly distinct from epilepsy in adults and they must be considered differently in most regards. (Wikipedia) [2].

Despite advances in epilepsy treatment, a large treatment gap exists in India, which can be attributed to the lack of knowledge of antiepileptic drugs (AEDs), poverty, cultural beliefs, stigma, poor health care infrastructure, and shortage of trained professionals. The annual economic burden of epilepsy in India is 88.2% of the gross national product (GNP) per capita and 0.5% of the GNP. (Thomas S.V. et al.,2001)[3]

Scientometrics

Scientometrics is a branch of Library and Information Science used to measure and analyse Science. Scientific activites can be quantified by applying scientometric tools. "Scientometrics is the quantitative evaluation and intercomparison of scientific activity, productivity and progress."[4]

Gupta and Bala (2013) [5] attempted to analyse the data for the period 2002-2011 on epilepsy research in India using Scopus database. The study covered growth rank and global publication share, citation impact, international collaborative papers etc and concluded that India stands on 11th position with 2.88% share and its citation impact per paper was 2.77.

Rasolabadi et al. (2015) [6] tried to analyse the epilepsy research output of Iran based on the data in Scopus for 2000-2014. A total of 702 papers were analysed and Iran ranked 25th among 25 countries. The study concluded that Iran is collaborating with 36 countries.

Zamani et al. (2014) [7] conducted a study to assess the life of adolescents with epilepsy in Iran. They indicated the need for greater concern about psychological status & risk factors for the QOL of adolescents with epilepsy in Iran.

Michael H.K. Bendels et al.(2017) [8] examined the state of gender equality in epilepsy research by analyzing the female authorship from 2008-2016 . They analysed a total of 10,6282 authorships from 22,180 epilepsy related articles and found that the female authorship ratios showed substantial growth in

recent years. The study concludes with a prognosis concerning the future development of gender disparities within epilepsy research.

Objectives

A Scientometric study in the area of epilepsy will help the scientist to know the research and development in this area and to progress further study. The main objectives of the study are:

1. To find out the growth of literature on epilepsy research from 2002-2016.
2. To identify the country-wise contribution in epilepsy research.
3. To examine the most productive journals in the area of epilepsy research.
4. To find out the subject wise distribution in epilepsy research.
5. To identify the most productive authors in the area of epilepsy research.
6. To assess the scientific productivity of Indian authors in epilepsy research.

Methodology

The data for the present study was collected from Jgate Plus database for a period of 15 years, from 2002-2016. The data was retrieved using the search key word 'epilepsy' for a period of 15 years in all fields. Spread sheet application method was used for analysis. Jgate Plus (https://jgateplus.com) is an electronic gateway to global e-journal literature with 49, 000 journals indexed and launched by Informatics India Limited in 2001.

Results

1. Year-wise Distribution of Epilepsy Research

Table-1 reflects the year wise distribution of epilepsy research. A total of 54435 records were produced during 2002-2016 for 15 years. The highest number of publications were in 2015 (5133) and the lowest publication on epilepsy research produced in 2002 (2123). The result shows an increasing trend in the growth pattern of epilepsy research from 2002 -2015 and slight decreasing trend in the year 2014 and 2016. The growth pattern of epilepsy research for 15 years is graphically represented in figure 1.

Table 1: Year-wise productivity

Year	Total	Percentage
2002	2123	3.90
2003	2342	4.30
2004	2599	4.77
2005	2747	5.05
2006	2889	5.30
2007	3114	5.72
2008	3190	5.86
2009	3520	6.47
2010	3865	7.10
2011	4078	7.49
2012	4205	7.72
2013	4894	8.99
2014	4842	8.89
2015	5133	9.42
2016	4894	8.99
TOTAL	**54435**	**100**

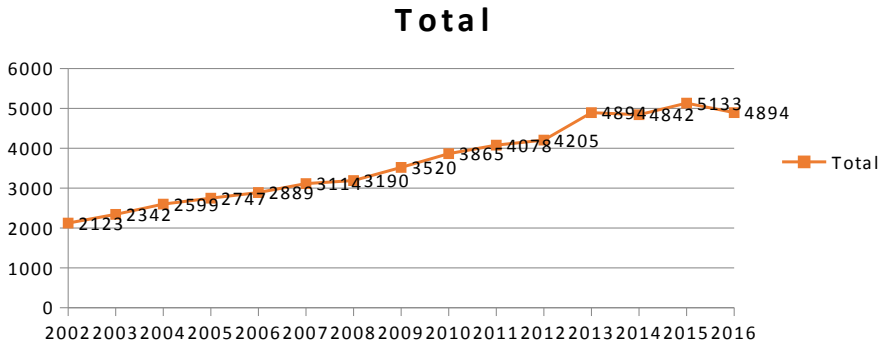

Figure 1: Year wise Productivity

2. Country-wise distribution

Table 2 shows the country wise distribution of epilepsy research. A total of 100 countries produced the publications on epilepsy research for 15 years. The below table shows the top 20 countries producing the epilepsy research output. The data reveals that United States of America produces the highest publication on epilepsy research with 19273 records. Netherlands stands 2nd position with 15202 records in epilepsy research, followed by UK (7027), and Germany (4334). India stands 5th position in the production of epilepsy research output. Canada produces the lowest publication in epilepsy research with 183 records

Table 1: Country-wise distribution of epilepsy research

Country	2002-2016
United States of America	19273
Netherlands	15202
United Kingdom	7027
Germany	4334
India	1776
Japan	1026
Switzerland	740
Brazil	601
Turkey	597
Iran	441
France	386
Malaysia	279
South Korea	230
Italy	188
Canada	183

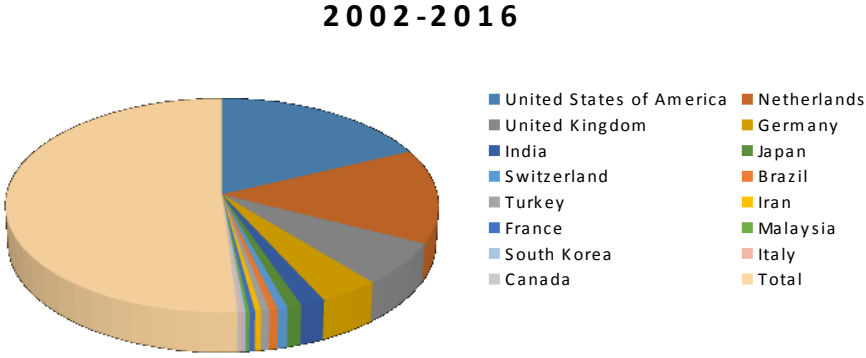

Figure 2: Country-wise distribution of epilepsy research

3. Journal wise distribution of epilepsy research

The literature on epilepsy research is spread over 100 journals. Table 3 shows the top 20 journals producing epilepsy research. The journal named 'Epilepsia' produces the highest number of publications on epilepsy with 4619 publications and with SJR 2.261 and H index 168.0. The journal 'epilepsy and behaviour' stands the 2nd position in the production of epilepsy research literature with 3787 publications. The table shows the top 20 journals with their total publications, Country of publication, Scimago journal country rank (SJR). European Journal of Paediatric Neurology produces the lowest publications in epilepsy research with 396 publications.

Table 3

Name of the Journal	Total Publications	Country of Publication	SJR
Epilepsia	4619	US	2.261
Epilepsy and behaviour	3787	Netherlands	1.131
Epilepsy research	1915	Netherlands	0.956
Seizure	1745	Netherlands	1.16
Neurology	1173	US	3.399
Journal of the Neurological Sciences	699	US	1.2
Clinical Neurophysiology	659	US	1.561
Epileptic disordes	627	US	0.64
Pediatric Neurology	552	Netherlands	0.83
Journal of child Neurology	549	Great Britain	0.799
Brain and development	475	Japan	0.686
Journal of Neuroscience	466	US	4.466
Epilepsy currents	465	US	0.463
PLos One	412	US	1.164
European Journal of Paediatric Neurology	396	Great Britain	0.97

4. Subject wise break up of epilepsy research

Table 4 shows the subject break up of epilepsy research for the period 2002-2016. The top 20 subjects are tabulated here. The table reveals that most of the publications in epilepsy research is coming from the subject Neurology with highest publications 30899(56.76%) followed by cerebrovascular diseases with 5052 papers (9.28%), paediatrics with 4248 papers (7.80%). It is graphically represented in the Figure 4.

Table 4: Subject distribution

Subject	Total Publications	Percentage
Neurology	30899	56.76
Cerebrovascular diseases	5052	9.28
Paediatrics	4248	7.80
Pharmacy and Pharmacology	3892	7.15
Psychiatry and Psychology	3692	6.78
Diseases	3653	6.71
Clinical medicine	1718	3.16
Surgery	1696	3.12
Medical education, training	1506	2.77
Physiology	1501	2.76
Public health	1416	2.60
Biology	1231	2.26
Genetics	1201	2.21

Subject	Total Publications	Percentage
Biochemistry	1162	2.13
Medical Pharmacology	961	1.77

5. Author productivity of Epilepsy research

The author productivity of the epilepsy research during the period 2002-2016 is shown in Table-5. Top 20 most productive authors, their total number of publications and their affiliation is tabulated here. The table shows that Samuel F Berkovic is the most productive author in the area of epilepsy research for the period 2002-2016 with 227 publications from Australia, followed by Christian E Elger with 195 publications from Germany and, Pasquale Striano with 187 publications from Italy.

Table 5: Author productivity

Author	Publications	Affiliation
Samuel F Berkovic	227	Epilepsy Research Centre, University of Melbourne and Autism Health, Australia.
Christian E Elger	195	Department of Epileptology, University of Bonn, Germany
Pasquale Striano	187	Department of Neurosciences, Gaslini Institute, Italy
Orrin Devinsky	184	Department of Neurology, NYU Langone Medical Centre, New York, USA
Ingrid E Scheffer	180	Department of Paediatrics, University of Melbourne, Australia
Josemir W Sander	171	Department of Clinical and Experimental epilepsy, Institute of Neurology, London, UK
John S Duncan	160	Department of Clinical and Experimental epilepsy, Institute of Neurology, London, UK
Renzo Guerrini	140	Anna Meyer Children's hospital, University of Florence, Italy
Alberto Verrotti	138	Department of Pediatrics, University of L 'Aquila, Italy
Wolfgang Loscher	127	Department of Pharmacology, University of Veterinary Medicine, Germany
Emilio Perucca	123	Department of Neurology, Langone School of Medicine, New York University, USA.
Samuel Wiebe	123	Department of Clinical Neurosciences and community Health Sciences, University of Calgary, Canada.
J Helen cross	115	The Prince of Wales's chair of childhood epilepsy & honorary consultant in Paediatric Neurology, UCL Institute of child helath, UK.
Jean Gotman	112	Department of Neurology & Neurosurgery, Montreal Neurological Institute & hospital, McGill University, Canada
Michael R Sperling	111	Department of Neurology, Philadelphia, USA

6. Productivity of Indian authors

Table -6 shows the top 10 most productive Indian authors in the area of Epilepsy research from 2002-2016. It depicts that ManjariTripathi is the most productive Indian author with 60 articles in epilepsy research, followed by KurupathRadhakrishnan with 41 articles and HarinderJaseja with 32 publications. Overall publications shows that the contribution of Indian authors in the area of Epilepsy research is very less compared to other countries in the world.

Table 6: Indian Authors productivity

Author	Publication
ManjariTripathi	60
KurupathRadhakrishnan	41
HarinderJaseja	32
P. Satishchandra	27
SheffaliGulati	23
SanjibSinha	20
ChitraSarkar	19
P. Sarat Chandra	18
Rajesh Kumar Goel	18

Conclusion

The present study analysed a total of 54435 papers in the area of epilepsy research for the period of 2002-2016 (15 years) based on the data collected from Jgate Plus database. The study attempted to identify the growth and development of epilepsy research and found that there is a gradual growth of literature from 2002-2015 and a slight decline in the year 2014 and 2016. The study identified the most productive author world wide and also the productivity of Indian authors. It shows that the scientific productivity of Indian authors is less compared to other countries in the world. The present study emphasises the need to give more attention in the area of epilepsy research by the Indian authors for further development in this area. The study could find out that United states of America is the most productive country with the highest publication (19273) and India stands on the 5th position in the contribution of epilepsy research. The Journal 'Epilepsia" is the most productive journal with 4619 articles on epilepsy and is published in US.

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Open Access Scholarly Communication: A Bibliometric Assessment of Global Publications During 2006-2020

Dillip Kumar Parida, Kunwar Singh & Satyajit Nayak

Abstract

The study explores the quantitative aspect of global research publications on open access scholarly communication between 2006 to 2020. The data were collected from the Scopus database covering the 16 identified years. The study employs relevant bibliometric metrics, such as Relative Growth rate, Doubling time, Co-Authorship Index (CAI) and Degree of collaboration (DC), Author productivity, CAGR, Relative citation impact, and highly cited papers. The authors also employed the VOSviwer programme to show bibliographic coupling with documents, co-authorship with organisations, and co-authorship with authors. During the study period, 924 papers were identified, with a total of 7380 citations from 2064 authors. The global publications on this theme RGR decreased from 0.84 in 2007 to 0.10 in 2020. The identical Dt for various years continuously improved from 0.83 in 2007 to 7.18 in 2020. CAI for single-authors has varied from 145.83 to 74.12. The compound annual growth rate that distinguished the total average number of authors per article is 2.11, and the average productivity per author is 0.49. The highest no of author productivity that is 2.92, was published in the year 2020. "The state of OA: A large-scale analysis of the prevalence and impact of Open Access articles" was published in the year 2018 and has the highest number of citations, 315. This bibliometric study will enlarge the knowledge base of information professionals on the research trend in open access scholarly communication. The study will benefit both researchers and the general public by enhancing the visibility, readership, and effect of authors' works, as well as encouraging support for scientific enterprise and collaborative research activities. The study also found that open access scholarly communication

minimizes barriers to literature access, providing it more accessible to a wider range of people.

Keywords: *Bibliometric, Scientometric, Open access, Scholarly communication, Co-Authorship Index, Degree of collaboration, Relative Growth Rate, Doubling time.*

Introduction

The Internet and computer technology have increased scientists' desire to share their research with the public. Open access is replacing traditional scholarly publishing (Kumar & Bansal, 2008). Some academics and scientists believe that public access to their research and writing should be free. Journals (publications) are vital in scientists' and intellectuals' academic activity. Scholarly communication is a process that starts with an idea and ends with a peer-reviewed publication. Ideas were traditionally discussed informally or impersonated at workshops and colloquia. After publication, other scholars reviewed and cited the findings. The internet has changed both formal and casual intellectual communication. The trellis allows for faster communication with colleagues via email or video conferencing, and publication in institutional repositories, full text databases, or open access journals (Kling & McKim, 1999; Holmberg & Thelwall, 2014). Other learning tools such as mobile phones and broadcast interfaces are transforming scholarly communication (Borgman & Fumer, 2002).

Also, bibliometrics is an important topic in library and information science. Pritchard used the term bibliometrics in 1969 to represent a statistical approach to all domains of knowledge (Patel et al., 2021a; Rawat et al., 2021). Many bibliometric tools, such as VOSviewer, have been developed to help scholars examine and understand the development and evolution trend.

Related works

Gupta, Dhawan, and Mamdapur (2021) evaluated India's support vector machine (SVM) research based on various bibliometric indicators. The study's finding revealed that with a global publication share of 48.60% in SVM research, China leads the world ranking. Gupta, Mamdapur, and Dayal (2021) analyzed the Black Fungus (Mucormycosis) research in India, and the study analysis found that between 1998 and 2021, India produced 799 publications on mucormycosis. The publications expanded at an annual rate of 8.5 percent and a cumulative rate of 175.1 percent, with an average of 9.6 citations per piece (CPP). People from other countries co-authored only 8.7% of the papers. Chiu and Ho (2007) conducted a bibliometric analysis of tsunami research and noticed that the US & Japan contributed 53% of the entire output. English was the principal language, including 95% of articles. Singh, Nayak, and Varma

(2017) researched & determined that the highest number of contributions, 52(18.98%), were published in 2011. Single authors dominate in the authorship pattern with 187(71.92%) publications. Patel et al. (2021b) studied the Publication trends in financial inclusion, and the study result revealed that the majority of publications in 1550 were articles (i.e., 1156). The most productive country was India, with a list of 417 publications.

Objectives

The following key objectives of the study are:

1. To examine the relative growth rate and doubling time;
2. To determine the co-authorship index (CAI) and degree of collaboration (DC);
3. To study the author productivity and CAGR, relative citation impact, and highly cited papers;
4. To find out overlay visualization of bibliographic coupling with documents, co-authorship with organization, and co-authorship with authors.

Materials and methods

The required data on publications were retrieved from the Scopus database (http://www.scopus.com) on 26 October 2021. It is the world's most extensive interdisciplinary database of abstracts and citations. The following search string was used :((TITLE-ABS-KEY (Open Access) AND TITLE-ABS-KEY(Scholarly communication)) AND LIMIT TO (2020) AND (2006)).

Data Analysis

To make the desired observations, the data was tabulated, assessed, and examined using a range of bibliographic indicators after it was extracted. Using a range of bibliometrics indicators, the authors looked at the publishing patterns of Open Access and Scholarly communication. VOSviewer software version 1.1.16 was also used to visualize data.

Relative growth rate and doubling time

The relative growth rate (RGR) is calculated based on the formula cited by Rawat et al. (2021) in their study and mentioned as follows:

RGR = (1-2^r) = (Ln (W2) - Ln(W1))/ (T2 - T1) × 100

Doubling time of the published literature is an excellent measure to estimate the time after which total literature gets double (Rai, Singh & Varma, 2020). It is equal to the natural logarithm of 2, divided by RGR.

Doubling Time = D (t)= 0.693/RGR

Table 1 shows RGR and Dt publications. The RGR declined from 0.84 in 2007 to 0.10 in 2020. The majority norm for the first five years (2006–2010) was 0.46. The average applicable maturity rate during the middle five years (2011-2015) fell to 0.18 and the last five years (2016-2020) dropped to 0.13. Dt improved from 0.83 in 2007 to 7.18 in 2020. The mean Dt for the first five years (2006-2010) was 1.85, which increased to.94 in the middle years (2011-2015) and to 5.53 in the last break year (i.e., 2016-2020). Table 1 shows the same Dt as the publication growth rate decreased.

Table 1: Relative growth rate and doubling time

Year	TP	TPC	LogW1	LogW2	RGR	Dt	Mean RGR	Mean Dt
2006	32	32		3.47				
2007	42	74	3.47	4.30	0.84	0.83		
2008	35	109	4.30	4.69	0.39	1.79	0.46	1.85
2009	48	157	4.69	5.06	0.36	1.90		
2010	43	200	5.06	5.30	0.24	2.86		
2011	44	244	5.30	5.50	0.20	3.49		
2012	45	289	5.50	5.67	0.17	4.09		
2013	63	352	5.67	5.86	0.20	3.51	0.18	3.94
2014	68	420	5.86	6.04	0.18	3.92		
2015	67	487	6.04	6.19	0.15	4.68		
2016	78	565	6.19	6.34	0.15	4.66		
2017	83	648	6.34	6.47	0.14	5.06		
2018	84	732	6.47	6.60	0.12	5.69	0.13	5.53
2019	107	839	6.60	6.73	0.14	5.08		
2020	85	924	6.73	6.83	0.10	7.18		

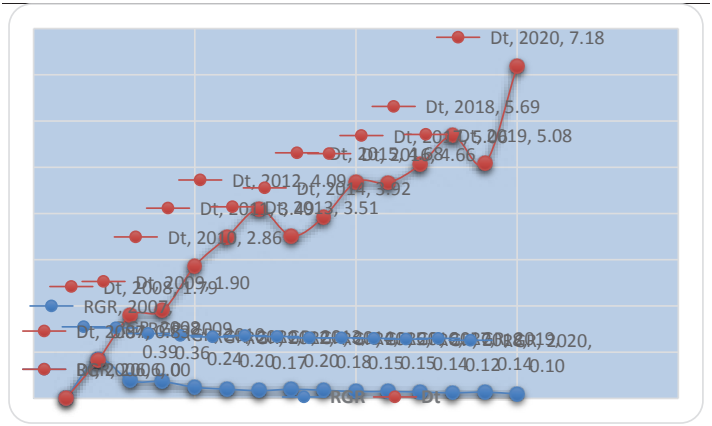

Figure 1: Relative growth rate and double time publication

Co-authorship index

The co-Authorship Index (CAI) is obtained by calculating the publication proportionately by single, two, and multi-authored papers (Garg & Padhi, 1999). This formula was also cited by Singh et al. (2021) in their study.

$$CAI = \frac{Nij/Nio}{Noj/Noo} * 100$$

Where,

Nij = number of papers having authors in block i.

Nio =Total output of block i.

Noj = number of papers having j authors for all blocks.

Noo =Total number of papers for all authors and all blocks.

Table 2 shows that the rate of CAI for single authors has fluctuated from 145.83 to 74.12. There are more single-author publications than multi-author publications. The greatest collaborative application among three authors (209.31) was seen in 2020, followed by 159.57 in 2019.

Table 2: Co-Authorship Index

Year**	Solo Author**	CAI**	Two Author**	CAI**	Three Author**	CAI**	> Three**	CAI**	Total**
2006	20	145.83	6	63.00	1	31.39	5	89.67	32
2007	24	133.33	12	96.00	3	71.74	3	40.99	42
2008	18	120.00	9	86.40	3	86.09	5	81.99	35
2009	28	136.11	13	91.00	3	62.77	4	47.83	48
2010	15	81.40	22	171.91	2	46.71	4	53.39	43
2011	22	116.67	17	129.82	3	68.48	2	26.09	44
2012	22	114.07	15	112.00	5	111.59	3	38.26	45
2013	37	137.04	16	85.33	5	79.71	5	45.55	63
2014	22	75.49	23	113.65	10	147.70	13	109.72	68
2015	30	104.48	20	100.30	7	104.93	10	85.66	67
2016	32	95.73	20	86.15	8	103.01	18	132.44	78
2017	28	78.71	28	113.35	11	133.11	16	110.63	83
2018	34	94.44	25	100.00	7	83.70	18	122.98	84
2019	37	80.69	29	91.07	17	159.57	24	128.73	107
2020	27	74.12	20	79.06	7	82.71	31	209.31	85
Total	396		275		92		161		924

Degree of collaboration (DC) and rate of single authorship (RSA)

Various methods have been proposed to calculate the degree of research collaboration. Here, in this study, the formula proposed by Subramanyam (1983) has been used, and also this formula is cited by Patel et al. (2021c) in their study.

$$DC = \frac{Nm}{Ns + Nm}$$

Where,

Nm = number of multi-authored papers in the discipline

Ns = number of single-authored papers in the discipline

Rate of single authorship

$$RSA = \frac{Ns}{Ns + Nm}$$

Nm = number of multi-authored papers in the discipline

Ns = number of single-authored papers in the discipline

So, throughout the 15 years (2006-2020), the rate of collaboration is 0.55, while solo authorship is 0.45. However, when we look at 15 years of partnership, the results are lopsided. Data on multi-authored papers, collaboration, and single authorship are shown in Table 3. The research increases the degree of year-long collaboration from 0.38 to 0.68. The RSA declined from 0.63 in 2006 to 0.32 in 2020. Multiple authorship is more common than single authorship.

Table 3: Degree of collaboration (DC) and Rate of Single Authorship (RSA)

Year	Total	Single	Multiple	DC	RSA
2006	32	20	12	0.38	0.63
2007	42	24	18	0.43	0.57
2008	35	18	17	0.49	0.51
2009	48	28	20	0.42	0.58
2010	43	15	28	0.65	0.35
2011	44	22	22	0.50	0.50
2012	45	22	23	0.51	0.49
2013	63	37	26	0.41	0.59
2014	68	22	46	0.68	0.32
2015	67	30	37	0.55	0.45
2016	78	32	46	0.59	0.41
2017	83	28	55	0.66	0.34
2018	84	34	50	0.60	0.40
2019	107	37	70	0.65	0.35
2020	85	27	58	0.68	0.32
Total	924	396	528	0.55	0.45

Author productivity and CAGR

The compound annual growth rate is defined as:

$$CAGR = \frac{(Final\ year\ publication/First\ \ year\ publication)}{(1/n-1)} - 1$$

Table 4 shows that the outline is linked to author productivity and CAGR, with a mean number of authors per article of 2.11 and a mean outcome per author of 0.49. The year 2020 had the greatest author output of 2.92. The most notable outcome per author is 0.60, published in 2006. In the CAGR range -434.13 to -11.42 The CAGR is -44.42.

Table 4: Author Productivity and CAGR

Year	TP	TC	Total Authors	AAPP	PPA	CAGR
2006	32	368	53	1.66	0.60	-434.13
2007	42	537	73	1.74	0.58	-22.21
2008	35	166	63	1.80	0.56	-26.46
2009	48	451	89	1.85	0.54	-19.56
2010	43	435	85	1.98	0.51	-21.72
2011	44	621	75	1.70	0.59	-21.25
2012	45	293	82	1.82	0.55	-20.80
2013	63	486	96	1.52	0.66	-15.14
2014	68	511	174	2.56	0.39	-14.10
2015	67	551	133	1.99	0.50	-14.30
2016	78	741	218	2.79	0.36	-12.42
2017	83	723	188	2.27	0.44	-11.73
2018	84	768	204	2.43	0.41	-11.61
2019	107	481	283	2.64	0.38	-9.33
2020	85	248	248	2.92	0.34	-11.48
Total	924	7380	2064			
Mean				2.11	0.49	-44.42

*AAPP=Number of authors/no of papers,
PPA=No of papers/ No of authors,
CAGR=Compound annual growth rate

Relative citation impact of top five authors

The study discernibility and influence of individual authors in the research area of "open source" and "Scholarly communication" "relative citation impact (RCI)" was measured applying the following method:

$$RCI = \frac{\text{A Country's share of world citations}}{\text{Country's share of world publications}}$$

RCI = 1 shows that country's citation rate is equal to the world's citation rate.

Whereas RCI > 1 value indicates that country's citation rate is higher than the world's citation rate.

The value of RCI < 1 indicates that country's citation rate is less than the world's citation rate.

The RCI depicted in Table 3 is more inKitas, G.D. & Pinfield, S. (1.86 & 1.69) respectively, and Pinfield, S. has the highest h-index (i.e., 9). The author Nicholas, D., and Pinfield, S. has the same no of outcomes. McGrath M. has placed the lowest rank in RCI (i.e., 0.03) and least no h-index.

Table 5: Relative citation impact of top five Authors

Author	Papers	Citations	RCI	h-index
Nicholas, D.	11	151	0.83	5
Pinfield, S.	11	308	1.69	9
Gasparyan, A.Y.	9	248	1.66	8
Giglia, E.	9	30	0.20	3
Abrizah, A.	8	128	0.96	5
Creaser, C.	8	204	1.54	8
Ezema, I.J.	8	95	0.72	6
Fry, J.	8	194	1.46	8
Manghi, P.	8	57	0.43	3
McGrath, M.	7	4	0.03	1
Spezi, V.	7	169	1.46	7
Watkinson, A.	7	142	1.22	5
Xia, J.	7	100	0.86	5
Xu, J.	7	74	0.64	4
Eve, M.P.	6	45	0.45	4
Herman, E.	6	134	1.35	4
Kitas, G.D.	6	185	1.86	6
Rodrigues, R.S.	6	6	0.06	1
Wakeling, S.	6	155	1.56	6
Willett, P.	6	155	1.56	6
Willinsky, J.	6	20	0.20	3
Total	157	2604		

Highly cited papers

Figure 6 presents the most referenced publications according to Scopus. Top cited papers in "open source and academic communication" study. The most cited paper is "Do open access articles have better citation impact?", published in 2018. A critical review of the literature" with 223 citations.

Table 6: Highly cited papers

Article Title	Bibliographic information	Year	Citation
"The state of OA: A large-scale analysis of the prevalence and impact of Open Access articles"	"Piwowar H., Priem J., Larivière V., Alperin J.P., Matthias L., Norlander B., Farley A., West J., Haustein S., PeerJ, 10.7717/peerj.4375"	2018	315
"Do open access articles have greater citation impact? A critical review of the literature."	"Craig I.D., Plume A.M., McVeigh M.E., Pringle J., Amin M., Journal of Informetrics, 10.1016/j. joi.2007.04.001"	2007	223
"The academic, economic and societal impacts of Open Access: An evidence-based review"	"Tennant J.P., Waldner F., Jacques D.C., Masuzzo P., Collister L.B., Hartgerink C.H.J., F1000Research, 10.12688/f1000research.8460.1"	2016	178
"Citizens without sovereignty: Equality and sociability in french thought"	"Gordon D., Citizens without Sovereignty: Equality and Sociability in French Thought"	2017	124
"Multiple public spheres of Weibo: a typology of forms and potentials of online public spheres in China"	"Rauchfleisch A., Schäfer M.S., Information Communication and Society, 10.1080/1369118X.2014.940364"	2015	90
"Medical Publishing Triage - Chronicling Predatory Open Access Publishers"	"Beall J., Annals of Medicine and Surgery, 10.1016/S2049-0801(13)70035-9"	2013	85
"Institutional Repositories, Open Access, and Scholarly Communication: A Study of Conflicting Paradigms"	"Cullen R., Chawner B., Journal of Academic Librarianship, 10.1016/j. acalib.2011.07.002"	2011	82
"Open access and Scopus: A new approach to scientific visibility from the standpoint of access"	"Miguel S., Chinchilla-Rodriguez Z., De Moya-Anegõn F., A new approach to scientific visibility from the standpoint of access, 10.1002/ asi.21532"	2011	78
"Open-access repositories worldwide, 2005-2012: Past growth, current characteristics, and future possibilities"	"Pinfield S., Salter J., Bath P.A., Hubbard B., Millington P., Anders J.H.S., Hussain A., Open-access repositories worldwide, 2005-2012: Past growth, current characteristics, and future possibilities, 10.1002/ asi.23131"	2014	78
"What is a predatory journal? A scoping review"	"Cobey K.D., Lalu M.M., Skidmore B., Ahmadzai N., Grudniewicz A., Moher D., F1000Research, 10.12688/ f1000research.15256.1"	2018	67
"The suitability of the unified theory of acceptance and use of technology (utaut) model in open access adoption studies"	"Dulle F.W., Minishi-Majanja M.K., Information Development, 10.1177/0266666910385375"	2011	65

Visualization of Bibliographic coupling

A citation score is used to visualise bibliographic connection with documents (figure 2). The minimal citation is 5 out of 924 documents, which fulfils the 357 requirements. 298 documents in 9 clusters Cluster 1 have 46 items, cluster 2 has 41, cluster 3 has 7, cluster 4 has 40, and cluster 9 has 17.

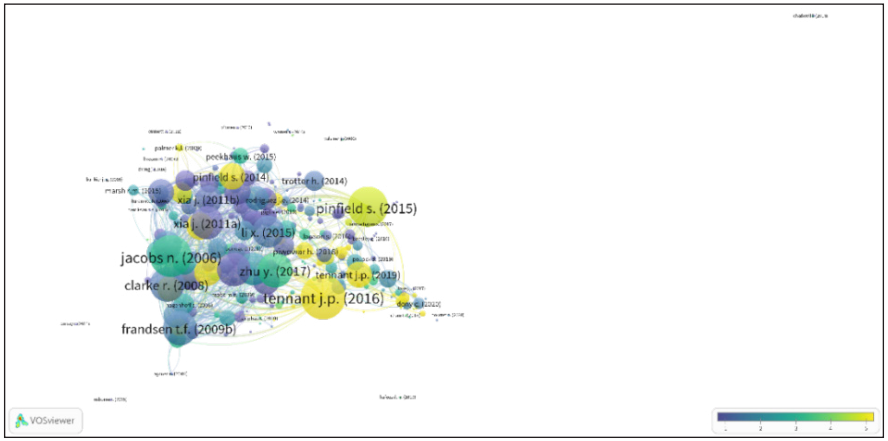

Figure 2: Overlay visualization of bibliographic coupling with documents

Overlay visualization of Co-authorship with organization

Fig. 3 shows co-authorship without organisation. The threshold satisfying the four organisations and the total strength of co-authorship relationships with other organisations is 5 out of 1466. It shows four clusters of four organisations each.

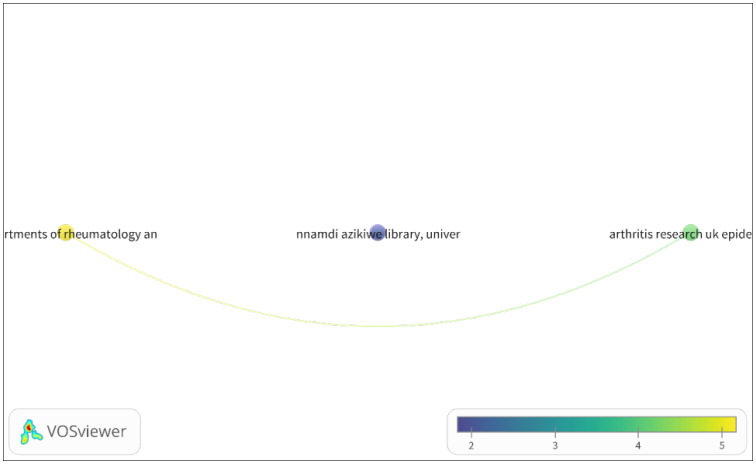

Figure 3: Overlay visualization of co-authorship with organization

Overlay visualization of Co-authorship with authors

Figure 3 illustrates a network map of the most referenced writers in open source and academic communication research. Figure 1. Citation author circles the weight of an object determines its size (Label, circle, or frame). The article's procedure or structure expands in proportion to the item's prominence.

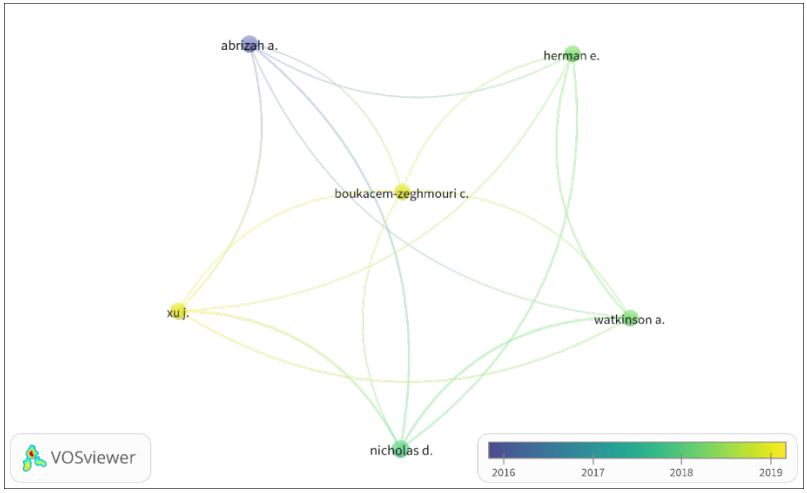

Figure 4: Overlay visualization of co-authorship with authors

Conclusion

The goal of this study was to look at the quantitative aspect of global Open access scholarly communication research publication from 2006 to 2020. Because of its extensive coverage, the Scopus database was chosen for this investigation. It helps to evaluate institutions and an individual researchers' research production. Based on the VOS viewer visualisation, the study found that a total of 924 papers had 7380 total highly citations from 2064 authors. There's a network visualisation map of the most-cited authors, as well as overlay visualisations of bibliographic coupling with documents over total link strength with average citation score, overlay visualisation of co-authorship with no organisation, and overlay visualisation of co-authorship with no organisation. The results show that journals with greater citation counts publish more high-quality publications. The authors used bibliometric and scientific mapping analyses to extract useful information from the aforementioned data on "open access scholarly communication" literature. The authors believe that "open access scholarly communication" will be a boon to students, researchers, and academics who are conducting study in a variety of fields and on a variety of themes.

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Applicability of Bibliometric Laws and the Pattern of Growth Productivity in the Cryptocurrency Research

Prof. M.P. Singh & Vijay Kumar Bharati

Introduction

A cryptocurrency is a digital or virtual currency that is protected by encryption, making counterfeiting or double-spending practically impossible. Many cryptocurrencies are decentralized networks built on blockchain technology, which is a distributed ledger enforced by a network of computers. Cryptocurrencies are distinguished by the fact that they are typically not issued by any central authority, making them potentially impervious to government meddling or manipulation.

A cryptocurrency is a type of digital asset that is built on a network that is dispersed across many computers. Because of their decentralized nature, they may exist independently of governments and central authority.

The term "cryptocurrency" derives from the encryption techniques used to safeguard networks. Many cryptocurrencies rely on blockchains, which are organizational mechanisms for preserving the integrity of transactional data. Numerous experts predict that blockchain and associated technologies will have a significant impact on many areas, including banking and law.

Cryptocurrencies have come under fire for a variety of reasons, including their usage in unlawful operations, exchange rate volatility, and weaknesses in the infrastructure that supports them. They have been hailed, however, for their mobility, divisibility, inflation resistance, and transparency.

Bibliometrics is research that employs a procedure to engage the position and development trend of a certain subject with the use of mathematical,

statistical, and quantitative tools. Bibliometrics are increasingly being utilized to examine various aspects of research development within the context of the issue at hand. "Scientometrics as a measure of the scientific and technical advancement of any topic," writes E. J. Garfield (1979). Its computation is based on quantitative measurement of a subject or a set of indicators." This study used the Scopus database to gain a thorough grasp of the Applicability of Bibliometric Laws and the Pattern of Growth Productivity in Cryptocurrency Research.

Bradford's Law of Scattering

Samuel C. Bradford developed Bradford's law in 1934 to analyse the distribution of scientific books. Bradford's distribution theory states that "If Scientific periodicals are arranged in decreasing productivity of articles on a given subject, they may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same number of articles as the nucleus, where the number of periodicals in the nucleus and the succeeding zones will be as 1: n: n2." For scattering phenomena, he used the following formula.

Fx = a + b logx, where F(x) is the total number of references in the first x most productive journal and 'a' and 'b' are constants.

Lotka's Law Author Productivity

The Lotka's rule was examined using the chi-square approach on a number of writers who produced 'n'number of articles. The following equation can be used to represent it.

a = a1/n In contrast, n = 1, 2, 3

In other words, for every 100 writers who contributed one paper each, there would be 25 authors who contributed two articles each (100/22=25), around 11 authors who contributed three articles each (100/32 = 11.1), and so on. Where 'an' represents the number of writers who contributed 'n' papers each and a1 represents the number of authors who contributed one paper each. The chi-square is computed as (O-E)2/E O, where O = the observed number of authors with n publications.

E denotes the anticipated number of writers.

Objectives and Methods

- Recognize and list the key journals in the field of cryptocurrency research output using Bradford's Law of Scattering.
- To assess the advancement of research productivity in the field of cryptocurrency research.

Methodology

For the study, the data was retrieved from the Scopus database. The keyword for search literature is used (TITLE("cryptocurrency" OR "bitcoin")). Total 3242 articles have been extracted from the Scopus database. The Microsoft Excel and R studio Biblioshiny were used for interpretation and graphical representation of the data.

Data Analysis and Interpretation:

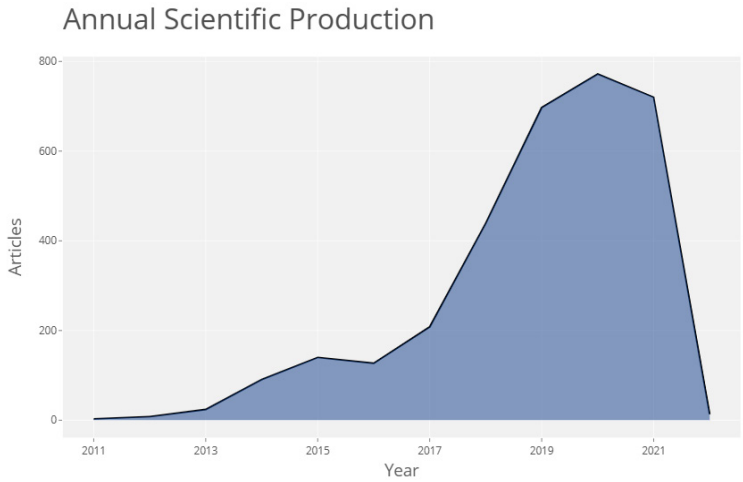
A total of 3242 records have been extracted from the Scopus database published on Cryptocurrency research. The received data is interpreted and calculated on the basis of the prescribed objectives.

Frequency distribution of publications on Cryptocurrency research Literature

Table 1. shows the no. of articles which are published in particular year on Cryptocurrency.It is found that the maximum 772 (23.8 %) articles were published in the year 2020 while 720 (22.2 %) articles have been published in 2021 secured the second position on Cryptocurrency Research. Further, it is also seen that a minimum of 03 (0.1 %) papers are published in the year 2011, 2012 and 2013. Overall, it has been observed that the publication on Cryptocurrency has been increased year by year consistently.

Table 1: Frequency distribution of publications on Cryptocurrency research Literature

Year	No. of Publications	% of 14111	Cumulative Growth	Cumulative Percentage
2011	3	0.1%	3	0.1%
2012	8	0.2%	11	0.3%
2013	24	0.7%	35	1.1%
2014	91	2.8%	126	3.9%
2015	140	4.3%	266	8.2%
2016	127	3.9%	393	12.1%
2017	208	6.4%	601	18.5%
2018	439	13.5%	1040	32.1%
2019	697	21.5%	1737	53.6%
2020	772	23.8%	2509	77.4%
2021	720	22.2%	3229	99.6%
2022	13	0.4%	3242	100.0%



Annual Growth Rate (AGR) of Cryptocurrency research Publication

The formula used for AGR calculation is given by Kumar and Kaliyaperumal in 2015. The following formula is used for AGR Calculation:

$$\mathbf{AGR} = \frac{\mathbf{W2 - W1}}{\mathbf{W1}} \times \mathbf{100}$$

In this formula AGR represent Annual Growth Rate, W2 present the end value of the publication and W1 present the first/ initial value of the publication

The table 2 provide a detail calculation of Annual Growth Rate on Cryptocurrency publication. Annual growth rate is calculated by above mentioned formula. It is found that the maximum AGR 279.17 percent were recorded in the year 2014 followed by 200.00 percent in 2013. Further it is also seen that the minimum (-) 9.29 percent AGR recorded in the year 2016 followed by (-) 6.74 in 2021.

Table 2: Annual Growth of Cryptocurrency research

Year	Initial /First Value of Publication W1	End Value of the Publication W2	W2-W1	AGR
2011	0	3	3	0
2012	3	8	5	166.67
2013	8	24	16	200.00
2014	24	91	67	279.17
2015	91	140	49	53.85
2016	140	127	-13	-9.29

Year	Initial /First Value of Publication W1	End Value of the Publication W2	W2-W1	AGR
2017	127	208	81	63.78
2018	208	439	231	111.06
2019	439	697	258	58.77
2020	697	772	75	10.76
2021	772	720	-52	-6.74
2022	720	13	-707	-98.19

Relative Growth Rate (RGR) on the Cryptocurrency Research and Doubling Time

A formula is used to calculate the relative growth rate of Cryptocurrency research articles. It depicts the year-over-year increase rate of Cryptocurrency publishing. The RGR for all of the publications was estimated using a developed model. Mahapatra is the creator of this model. The cumulative number of publications in a given year is used to determine RGR, and the Doubling Time is derived directly from RGR. The RGR will be calculated by the following formula:

$$\text{Relative Growth Rate (RGR)} = \frac{W2-W1}{T2-T1}$$

In this formula, RGR represent the relative growth rate, W1 is finding out by Log^e value of initial no. of publication, W2 is finding out by Log^e value of end number of publication, T1 represent the initial year and T2 represent the end year.

Doubling time of the publications: The doubling time of the publication on Cryptocurrency research is calculated by the following formula:

$$\text{Doubling Time (Dt)}: \frac{0.693}{R}$$

Whereas 0.639 is the constant value in the formula and R represent the relative growth rate (RGR) in the concerned year.

The table no. 3. shows the value of relative growth rate of publications on Cryptocurrency research. The calculation has been made by the above-mentioned formula. The maximum 1.33 RGR was recorded in the year 2014 followed by 1.10 RGR recorded in 2013 and the minimum -0.10 RGR recorded in the year 2016. Further, the calculation has been made for doubling time for the publications of Cryptocurrency research. It is find out that the doubling time of the publication is fluctuating year by year. Maximum 6.78 Dt is calculated in the year 2020 followed by 1.61 in the year 2015 and minimum -7.11 Dt was recorded in the year 2016.

Table 3: Relative Growth Rate (RGR) on the Cryptocurrency Research and Doubling Time

Year	Initial Value of Publications	New added Publications	End Value of Publication	W1	W2	RGR	Dt
2011	0	3	3	0.00	1.10	-	0.00
2012	3	8	11	1.10	2.08	0.98	0.71
2013	8	24	35	2.08	3.18	1.10	0.63
2014	24	91	126	3.18	4.51	1.33	0.52
2015	91	140	266	4.51	4.94	0.43	1.61
2016	140	127	393	4.94	4.84	-0.10	-7.11
2017	127	208	601	4.84	5.34	0.49	1.40
2018	208	439	1040	5.34	6.08	0.75	0.93
2019	439	697	1737	6.08	6.55	0.46	1.50
2020	697	772	2509	6.55	6.65	0.10	6.78
2021	772	720	3229	6.65	6.58	-0.07	-9.94
2022	720	13	3242	6.58	2.56	-4.01	-0.17

Bradford's law on Cryptocurrency Publications

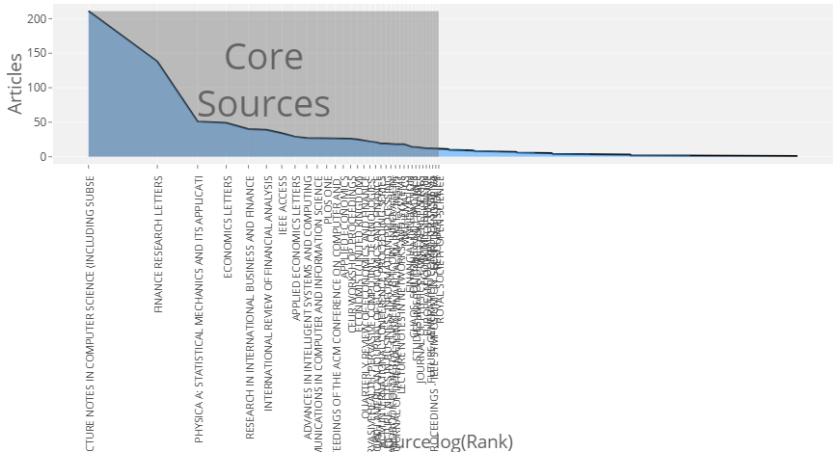
The Table 4 shows the Bradford's law of scattering of articles on Cryptocurrency Publications. It has been observed that first 33% that is 1080 articles published by 34 journals only of total publication placed in Zone 1 and next 33 % (1093) were placed in Zone 2 and last 33%(1068) publications were placed in Zone III.

Table 4: Bradford's law on Cryptocurrency Publications

Rank	Freq	cumFreq	Zone
1	211	211	Zone 1
2	138	349	Zone 1
3	51	400	Zone 1
4	49	449	Zone 1
5	40	489	Zone 1
6	39	528	Zone 1
7	34	562	Zone 1
8	29	591	Zone 1
9	27	618	Zone 1
10	27	645	Zone 1
11	27	672	Zone 1
12	27	699	Zone 1

Rank	Freq	cumFreq	Zone
13	26	725	Zone 1
14	26	751	Zone 1
15	25	776	Zone 1
16	23	799	Zone 1
17	22	821	Zone 1
18	21	842	Zone 1
19	19	861	Zone 1
20	19	880	Zone 1
21	18	898	Zone 1
22	18	916	Zone 1
23	18	934	Zone 1
24	18	952	Zone 1
25	16	968	Zone 1
26	14	982	Zone 1
27	14	996	Zone 1
28	13	1009	Zone 1
29	12	1021	Zone 1
30	12	1033	Zone 1
31	12	1045	Zone 1
32	12	1057	Zone 1
33	12	1069	Zone 1
34	11	1080	Zone 1
275	1093	2173(1093)	Zone 2
951	1068	3241(1068)	Zone 3

Bradford's Law

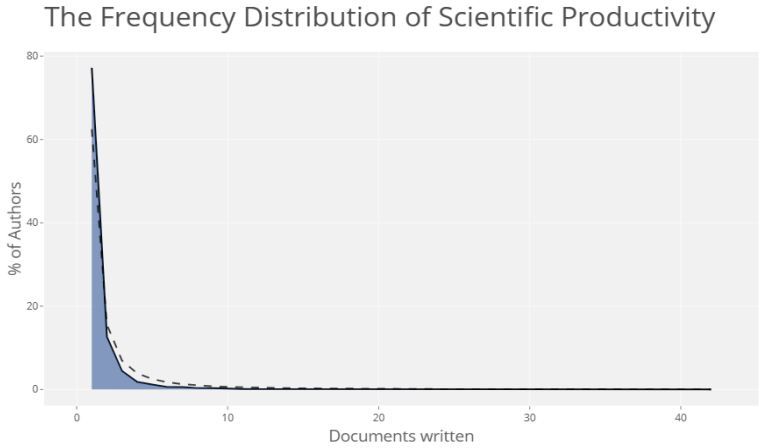


Lotka's law on Cryptocurrency Publications

The Table 5 shows the Lotka's law of author productivity on Cryptocurrency Publications. It has been observed that highest 42 papers have been written by only one authors while 4732 (7702 %) authors have been written one papers followed by 776 (12.7%) authors for two papers and 272 (4.4 %) authors associated for three papers.

Table 5: Lotka's law on Cryptocurrency Publications

Documents written	N. of Authors	Proportion of Authors
1	4732	77.2%
2	776	12.7%
3	272	4.4%
4	112	1.8%
5	73	1.2%
6	37	0.6%
7	36	0.6%
8	21	0.3%
9	20	0.3%
10	11	0.2%
11	8	0.1%
12	6	0.1%
13	6	0.1%
14	3	0.0%
15	5	0.1%
16	2	0.0%
17	1	0.0%
18	1	0.0%
20	2	0.0%
22	1	0.0%
24	2	0.0%
25	1	0.0%
26	1	0.0%
39	1	0.0%
42	1	0.0%



Findings and Conclusion

Bradford law is the most well-known and well-liked. Maximum 772 (23.8 %) articles were published in the year 2020 while 720 (22.2 %) articles have been published in 2021 on Cryptocurrency Research. Overall, it has been observed that the publication on Cryptocurrency has been increased year by year consistently. Maximum AGR 279.17 percent were recorded in the year 2014 followed by 200.00 percent in 2013 and the minimum (-) 9.29 percent AGR recorded in the year 2016 followed by (-) 6.74 in 2021. The maximum 1.33 RGR was recorded in the year 2014 followed by 1.10 RGR recorded in 2013 and the minimum -0.10 RGR recorded in the year 2016. The doubling time of the publication is fluctuating year by year. Maximum 6.78 Dt is calculated in the year 2020 followed by 1.61 in the year 2015 and minimum -7.11 Dt was recorded in the year 2016. It has been found that first 33% that is 1080 articles published by 34 journals only of total publication placed in Zone 1 and next 33 % (1093) were placed in Zone 2 and last 33%(1068) publications were placed in Zone III. highest 42 papers have been written by only one authors while 4732 (7702 %) authors have been written one papers followed by 776(12.7%) authors for two papers and 272(4.4 %) authors associated for three papers.

Bradford's law has been used to argue about how to build collections, how to choose journals to be indexed in bibliographies, how to measure bibliography coverage, how to solve practical problems related to information seeking and retrieval, and by Bradford himself to argue for a new way to organize bibliographical work and documentation. These reader zones were utilized to identify the most popular publications since these periodicals are required reading for regular library patrons. Because of the invariability of the Lotka rule, a variety of subjects, it may be used to disseminate the production

of certain groups of authors. It is critical for libraries to be aware of the most prolific writers and to be able to get their writings. As a result, this work has a wide range of applications in information management, librarianship, scientific history, including science policy, science studies, and many areas of social sciences and scientists.

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About the Authors…

Dr. M. P. Singh is working as a Professor in the Department of Library and Information Science and also, holding position of PIC Establishment section at Babasaheb Bhimrao Ambedkar Central University, Lucknow, UP (India). He has more than 20 years of administrative and teaching experience in the LIS profession. Prof. Singh has been written 04 books, 14 edited books, and published more than 80 research papers and chaired many sessions in Conferences at various level. He has organized more than 10 conference and more than 6 webinars. Prof. Singh has been visited more than seven countries and awarded & honoured by Professor Veena Saraf Award-2018, Best Teacher Award and Best Library & Information Science Teacher's (LIST) Award-2018 at the International & National platform.

Vijay Kumar Bharati is working as Senior Assistant Librarian in Mahatma Gandhi Kashi Vidyapith (A UP State University) Varanasi since 2005. He did his MLIS and the BLIS from DLIS, BHU, Varanasi with first division, and cleared UGC-NET (JRF) in 2003. He has been written 02 books and published more than 35 research papers in various National and International Journals & also presented more than 50 research papers in International & National Conferences.

31

Citation Analysis of Published Scholarly Articles on Cryptocurrency Research

Vijay Kumar Bharati

Introduction

A citation informs your readers that particular content in your work came from another source and provides them with the information they need to locate that source again. Information about the Author(s) or Editor may be included in citations(s). Citation analysis is a method of determining the relative relevance or effect of an author, an article, or a publication by counting the number of times that author, article, or publication is referenced by other works. Web of Science (WoS), Scopus, and Google Scholar are the three most well-known citation analysis databases (GS) of citations from high-profile journals and other scholarly publications.

Cryptocurrency is a type of online payment that may be used to buy and sell products and services. Many businesses have created their own currencies, known as tokens, that can be exchanged for the goods or services that the business offers. Consider them to be the equivalent of arcade tokens or casino chips. To obtain the item or service, you will need to convert actual money for bitcoin. Blockchain is the technology that underpins cryptocurrency. Blockchain is a distributed ledger that handles and records transactions across multiple computers. This technology's security is one of its main selling points.

Objectives and Methods

The main objective of the chapter is to analyze the citation pattern and identify the most referenced papers in the field of Cryptocurrency Research.

For the study, the data was retrieved from the Scopus database. The keyword for search literature is used (TITLE("cryptocurrency" OR "bitcoin")).A total of 3242 articles have been extracted from the Scopus database. The Microsoft Excel and R studio Biblioshiny were used for interpretation and graphical representation of the data.

Data Analysis and Interpretation

A total of 3242 records have been extracted from the Scopus database published on Cryptocurrency Research. The received data is interpreted and calculated on the basis of the prescribed objectives.

1. Leading Information on Cryptocurrency Research

Table 1: Leading Information on Cryptocurrency Research

Description	Results
Timespan	2011:2022
Sources (Journals, Books, etc)	1260
Documents	3242
Average years from publication	2.07
Average citations per documents	16.99
References	93724
DOCUMENT TYPES	
Article	1802
Book	13
book chapter	102
conference paper	1180
conference review	5
Editorial	15
Erratum	11
Letter	13
Note	29
Retracted	1
Review	60
short survey	11
DOCUMENT CONTENTS	
Keywords Plus (ID)	7221
Author's Keywords (DE)	5163

Description	Results
AUTHORS	
Authors	6131
Author Appearances	9509
Authors of single-authored documents	461
Authors of multi-authored documents	5670
AUTHORS COLLABORATION	
Single-authored documents	577
Documents per Author	0.529
Authors per Document	1.89
Co-Authors per Documents	2.93
Collaboration Index	2.13

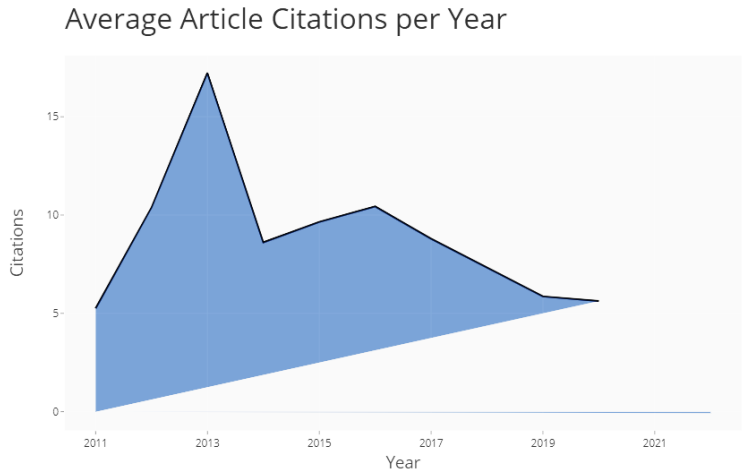
2. Total Average Citation Per Year/ Article

Table 2 shows the MeanTCperArt, MeanTCperYear, CitableYears on Cryptocurrency Research Publications. Mean Total Citation per Article (Highly cited year) was observed 2013with 137.87 citations per articles followed by 93.5 citations in 2012 and 60.27 in 2014. The detail citation analysis can be seen in following table.

Table 2: Total Average Citation Per Year/ Article on Cryptocurrency Research

Year	N	MeanTCperArt	MeanTCperYear	CitableYears
2011	3	52.66666667	5.266666667	10
2012	8	93.5	10.38888889	9
2013	24	137.875	17.234375	8
2014	91	60.27472527	8.610675039	7
2015	140	57.92857143	9.654761905	6
2016	127	52.18897638	10.43779528	5
2017	208	35.19711538	8.799278846	4
2018	439	22.00455581	7.334851936	3
2019	697	11.72883788	5.864418938	2
2020	772	5.630829016	5.630829016	1

Graph 2: Total Average Citations Per Year/ Article on Cryptocurrency Research



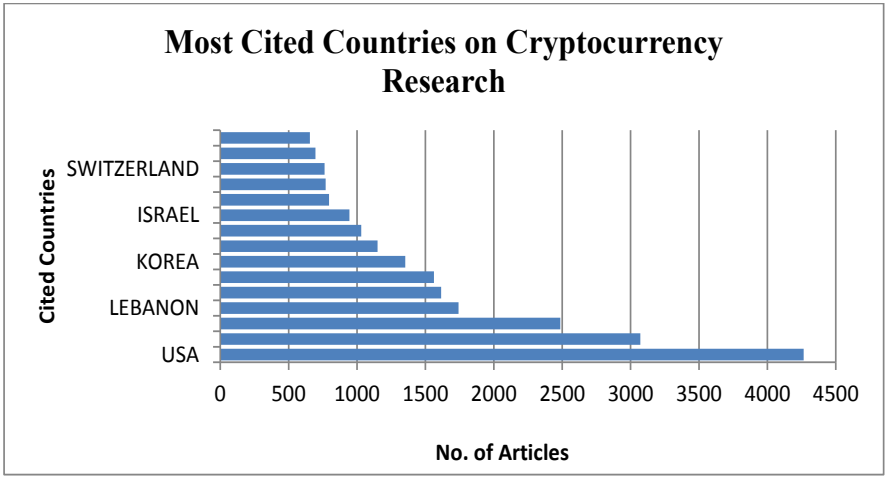
Most Cited Countries on Cryptocurrency Research

Table and graph 3. present the detail of most cited countries on Cryptocurrency Research. It has been observed that USA received highest 4265 citations with 21.87 citations per articles followed by United Kingdom 3071 citations with 29.25 citations per articles and China placed at third position with 2486 citation with average 8.57 citations per articles. India was placed at 14th position with 696 citations.

Table 3: Most Cited Countries on Cryptocurrency Research

Ranking	Country	Total Citations	Average Article Citations
1.	USA	4265	21.87
2.	United Kingdom	3071	29.25
3.	China	2486	8.57
4.	Lebanon	1742	79.18
5.	Ireland	1615	62.12
6.	Spain	1562	30.63
7.	Korea	1353	11.37
8.	Germany	1150	19.17
9.	Italy	1031	14.94
10.	Israel	944	94.40
11.	Greece	795	34.57
12.	Australia	771	17.52

Ranking	Country	Total Citations	Average Article Citations
13.	Switzerland	763	30.52
14.	India	696	9.53
15.	France	655	15.23
16.	Austria	406	36.91
17.	Czech Republic	399	28.50
18.	Norway	353	27.15
19.	Hong Kong	342	18.00
20.	Brazil	298	11.04



Graph 3: Most Cited Countries on Cryptocurrency Research

Top Twenty Highly Cited Documents (Articles)

The table and graph no 4. represent the detail of top twenty highly cited documents with their citations for last five years. A total of 9684 citations were calculated for last five years with twenty documents. During analysis, it is found that Bitcoin and beyond: A technical survey on decentralized digital currencies authored Tschorsch F., Scheuermann B. has been received maximum 764 citations, followed by Zerocash: Decentralized anonymous payments from bitcoin with 747 citations. Further it is seen that the Bitcoin: Medium of exchange or speculative assets? Authored by Baur D.G., Hong K., Lee A.D. received 20th position with 345 citations.

Table 4: Top 20 Highly Cited Documents

Years				2017	2018	2019	2020	2021	Sub total	>2021	Total
Publication Year	**Document Title**	**Authors**	**Journal Title**								
2016	Bitcoin and beyond: A technical survey on decentralized digital currencies	Tschorsch F., Scheuermann B.	IEEE Communications Surveys and Tutorials	32	114	214	231	168	759	3	764
2014	Zerocash: Decentralized anonymous payments from bitcoin	Ben-Sasson E., Chiesa A., Garman C., Green M., Miers I., Tromer E., Virza M.	Proceedings - IEEE Symposium on Security and Privacy	59	102	179	184	163	687	8	747
2016	Bitcoin-NG: A scalable blockchain protocol	Eyal I., Gencer A.E., Sirer E.G., Van Renesse R.	Proceedings of the 13th USENIX Symposium on Networked Systems Design and Implementation, NSDI 2016	33	93	199	175	125	625	5	639
2015	Bitcoin: Economics, technology, and governance	Bohme R., Christin N., Edelman B., Moore T.	Journal of Economic Perspectives	46	88	129	139	130	532	5	561
2013	Information propagation in the Bitcoin network	Decker C., Wattenhofer R.	13th IEEE International Conference on Peer-to-Peer Computing, IEEE P2P 2013 - Proceedings	44	66	147	149	96	502	1	559
2015	SoK: Research perspectives and challenges for bitcoin and cryptocurrencies	Bonneau J., Miller A., Clark J., Narayanan A., Kroll J.A., Felten E.W.	Proceedings - IEEE Symposium on Security and Privacy	56	108	123	123	84	494	3	536

Years				2017	2018	2019	2020	2021	Sub total	>2021	Total
Publication Year	**Document Title**	**Authors**	**Journal Title**								
2015	The Bitcoin backbone protocol: Analysis and applications	Garay J., Kiayias A., Leonardos N.	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	52	84	136	145	86	503	3	527
2016	Bitcoin, gold and the dollar - A GARCH volatility analysis	Dyhrberg A.H.	Finance Research Letters	9	41	111	153	184	498	3	503
2014	Majority is not enough: Bitcoin mining is vulnerable	Eyal I., Sirer E.G.	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	45	77	118	110	99	449	0	484
2016	The inefficiency of Bitcoin	Urquhart A.	Economics Letters	7	53	126	144	143	473	3	476
2013	Zerocoin: Anonymous distributed e-cash from bitcoin	Miers I., Garman C., Green M., Rubin A.D.	Proceedings - IEEE Symposium on Security and Privacy	49	61	93	99	79	381	4	466
2015	Speculative bubbles in Bitcoin markets? An empirical investigation into the fundamental value of Bitcoin	Cheah E.-T., Fry J.	Economics Letters	14	47	114	120	146	441	1	444

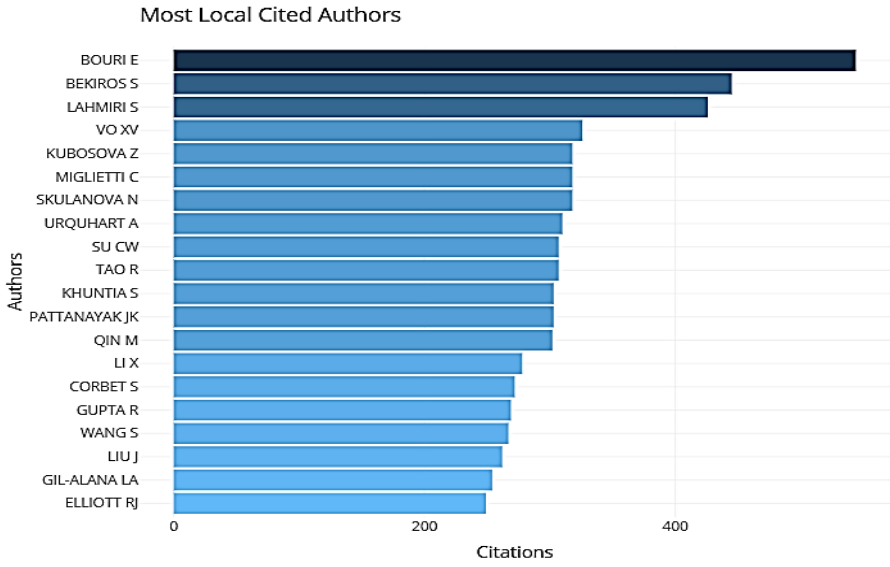
Years				2017	2018	2019	2020	2021	Sub total	>2021	Total
Publication Year	**Document Title**	**Authors**	**Journal Title**								
2013	Quantitative analysis of the full Bitcoin transaction graph	Ron D., Shamir A.	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	44	68	105	82	64	363	1	431
2017	On the hedge and safe haven properties of Bitcoin: Is it really more than a diversifier?	Bouri E., Molnar P., Azzi G., Roubaud D., Hagfors L.I.	Finance Research Letters	5	29	81	118	153	386	2	388
2015	Eclipse attacks on Bitcoin's peer-to-peer network	Heilman E., Kendler A., Zohar A., Goldberg S.	Proceedings of the 24th USENIX Security Symposium	22	44	104	110	87	367	3	382
2013	An analysis of anonymity in the bitcoin system	Reid F., Harrigan M.	Security and Privacy in Social Networks	37	53	86	77	60	313	1	378
2017	Volatility estimation for Bitcoin: A comparison of GARCH models	Katsiampa P.	Economics Letters	2	32	88	105	127	354	5	359
2013	BitCoin meets Google Trends and Wikipedia: Quantifying the relationship between phenomena of the Internet era	Kristoufek L.	Scientific Reports	17	36	65	103	86	307	1	349

Years				2017	2018	2019	2020	2021	Sub total	>2021	Total
Publication Year	**Document Title**	**Authors**	**Journal Title**								
2016	The economics of BitCoin price formation	Ciaian P., Rajcaniova M., Kancs D.	Applied Economics	13	37	87	103	104	344	2	346
2018	Bitcoin: Medium of exchange or speculative assets?	Baur D.G., Hong K., Lee A.D.	Journal of International Financial Markets, Institutions and Money	3	19	61	110	152	345	0	345
			Total	**589**	**1252**	**2366**	**2580**	**2336**	**9123**	**54**	**9684**

Most Local Cited Authors

Table and graph 5. show the detail of most cited authors on Cryptocurrency Research. It has been observed that BOURIE received highest 544 citations followed by BEKIROS, S with 445 citations and LAHMIRI, S with 426 citations for their articles. A detail of other cited authors can be seen in the following table:

Ranking	Author	Local Citations
	Bouri E	544
	Bekiros S	445
	Lahmiri S	426
	Vo Xv	326
	Kubosova Z	318
	Miglietti C	318
	Skulanova N	318
	Urquhart A	310
	Su Cw	307
	Tao R	307
	Khuntia S	303
	Pattanayak Jk	303
	Qin M	302
	Li X	278
	Corbet S	272
	Gupta R	269
	Wang S	267
	Liu J	262
	Gil-Alana La	254
	Elliott RJ	249

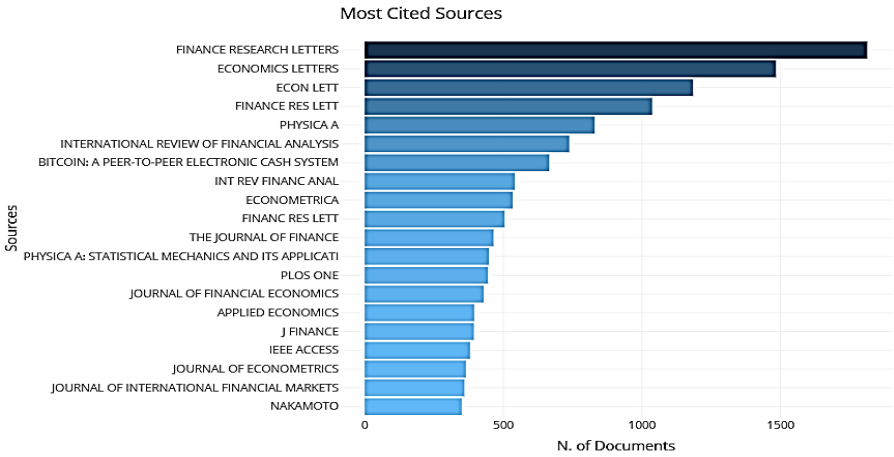


Most Local Cited Sources

Table and graph 6. present the detail of most cited source on Cryptocurrency Research. It has been observed that Finance Research Letters was the highly cited sources for their 1813 articles followed by Economics Letters for 1484 articles and Physica a Statistical Mechanics and Its Applications for their 830 articles. A detail of other most cited sources are mentioned in following table.

Ranking	Sources	Articles
	Finance Research Letters	1813
	Economics Letters	1484
	Econ Lett	1185
	Finance Res Lett	1037
	Physica A Statistical Mechanics And Its Applications	830
	International Review Of Financial Analysis	738
	Bitcoin: A Peer-To-Peer Electronic Cash System	666
	Int Rev Financ Anal	542
	Econometrica	534
	Financ Res Lett	505
	The Journal of Finance	465
	Physica A: Statistical Mechanics and Its Applications	448
	Plos One	445
	Journal Of Financial Economics	429

Ranking	Sources	Articles
	Applied Economics	395
	J. Finance	394
	IEEE Access	380
	Journal Of Econometrics	365
	Journal Of International Financial Markets	360
	Nakamoto	350

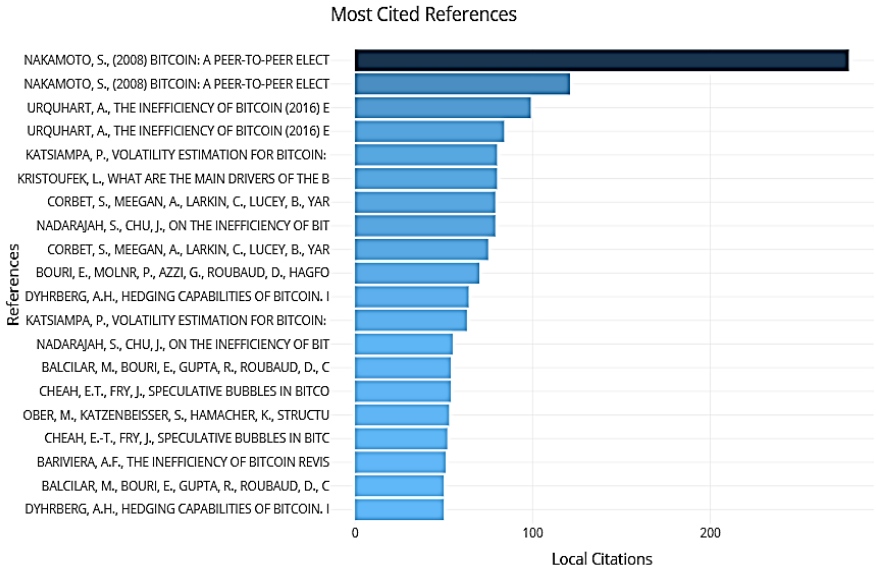


Most Cited References

The table and graph no 7. illustrate the detail of top twenty highly cited references with their citations. During analysis, it is found that Nakamoto, S., (2008) Bitcoin: A Peer-To-Peer Electronic Cash System placed at first position with 278 citations while Urquhart, A., The Inefficiency of Bitcoin (2016) Economics Letters, 148, Pp. 80-82 on the third position with 99 citations. Dyhrberg, A.H., Hedging Capabilities of Bitcoin. Is it the Virtual Gold? (2016) Finance Res. Lett., 16, Pp. 139-144 secured the 20th position with 50-time citations.

Ranking	Cited References	Citations
	Nakamoto, S., (2008) Bitcoin: A Peer-To-Peer Electronic Cash System	278
	Nakamoto, S., (2008) Bitcoin: A Peer-To-Peer Electronic Cash System, , Https://Bitcoin.Org/Bitcoin.Pdf	121
	Urquhart, A., The Inefficiency of Bitcoin (2016) Economics Letters, 148, Pp. 80-82	99

Ranking	Cited References	Citations
	Urquhart, A., The Inefficiency of Bitcoin (2016) Econ. Lett., 148, Pp. 80-82	84
	Katsiampa, P., Volatility Estimation for Bitcoin: A Comparison Of Garch Models (2017) Economics Letters, 158, Pp. 3-6	80
	Kristoufek, L., What Are The Main Drivers Of The Bitcoin Price? Evidence From Wavelet Coherence Analysis (2015) Plos One, 10 (4)	80
	Corbet, S., Meegan, A., Larkin, C., Lucey, B., Yarovaya, L., Exploring The Dynamic Relationships Between Cryptocurrencies And Other Financial Assets (2018) Economics Letters, 165, Pp. 28-34	79
	Nadarajah, S., Chu, J., On The Inefficiency Of Bitcoin (2017) Economics Letters, 150, Pp. 6-9	79
	Corbet, S., Meegan, A., Larkin, C., Lucey, B., Yarovaya, L., Exploring The Dynamic Relationships Between Cryptocurrencies And Other Financial Assets (2018) Econ. Lett., 165, Pp. 28-34	75
	Bouri, E., Molnr, P., Azzi, G., Roubaud, D., Hagfors, L.I., On The Hedge And Safe Haven Properties Of Bitcoin: Is It Really More Than A Diversifier? (2017) Finance Research Letters, 20, Pp. 192-198	70
	Dyhrberg, A.H., Hedging Capabilities Of Bitcoin. Is It The Virtual Gold? (2016) Finance Research Letters, 16, Pp. 139-144	64
	Katsiampa, P., Volatility Estimation For Bitcoin: A Comparison Of Garch Models (2017) Econ. Lett., 158, Pp. 3-6	63
	Nadarajah, S., Chu, J., On The Inefficiency Of Bitcoin (2017) Econ. Lett., 150, Pp. 6-9	55
	Balcilar, M., Bouri, E., Gupta, R., Roubaud, D., Can Volume Predict Bitcoin Returns And Volatility? A Quantiles-Based Approach (2017) Economic Modelling, 64, Pp. 74-81	54
	Cheah, E.T., Fry, J., Speculative Bubbles In Bitcoin Markets? An Empirical Investigation Into The Fundamental Value Of Bitcoin (2015) Economics Letters, 130, Pp. 32-36	54
	Ober, M., Katzenbeisser, S., Hamacher, K., Structure And Anonymity Of The Bitcoin Transaction Graph (2013) Future Internet, 5 (2), Pp. 237-250	53
	Cheah, E.-T., Fry, J., Speculative Bubbles In Bitcoin Markets? An Empirical Investigation Into The Fundamental Value Of Bitcoin (2015) Economics Letters, 130, Pp. 32-36	52
	Bariviera, A.F., The Inefficiency Of Bitcoin Revisited: A Dynamic Approach (2017) Econ. Lett., 161, Pp. 1-4	51
	Balcilar, M., Bouri, E., Gupta, R., Roubaud, D., Can Volume Predict Bitcoin Returns And Volatility? A Quantiles-Based Approach (2017) Econ. Model., 64, Pp. 74-81	50
	Dyhrberg, A.H., Hedging Capabilities Of Bitcoin. Is It The Virtual Gold? (2016) Finance Res. Lett., 16, Pp. 139-144	50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Local Citations

Findings and Conclusion

Citation analysis uses a variety of methodologies, such as citation counts, to determine the effect and trends of scholarship. Citation searching, unlike traditional database searching by Author or Subject, keeps note of where works (articles, books, conference proceedings, and so on) have been cited by other authors. 2.13 Collaborative index was calculated for 3242 documents published under Cryptocurrency Research indexed by Scopus. USA received highest 4265 citations with 21.87 citations per articles followed by United Kingdom 3071 citations with 29.25 citations per articles and China placed at third position with 2486 citation with average 8.57 citations per articles. India was placed at 14th position with 696 citations. Mean Total Citation per Article (Highly cited year) was observed 2013with 137.87 citations per articles followed by 93.5 citations in 2012 and 60.27 in 2014. A total of 9684 citations were calculated for last five years with twenty documents. During analysis, it is found that Bitcoin and beyond: A technical survey on decentralized digital currencies authored Tschorsch F., Scheuermann B. has been received maximum 764 citations, followed by Zerocash: Decentralized anonymous payments from bitcoin with 747 citations. Further it is seen that the Bitcoin: Medium of exchange or speculative assets? authored by Baur D.G., Hong K., Lee A.D. received 20th position with 345 citations. BOURIE received highest 544 citations followed by BEKIROS, S with 445 citations and LAHMIRI, S with 426 citations for their articles. ***Finance Research Letters*** was the highly cited sources for their 1813 articles followed by ***Economics Letters*** for 1484 articles on Cryptocurrency Research. In this way, Citation analysis of cryptocurrency

research articles is becoming increasingly important in measuring scientific progress. Scientific journals, individual researchers, research groups, research institutions, universities, and whole nations are assessed based on their scientific publications and citations.

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An Overview of Occupational Opportunities for Librarians in India

Dr. O. P. Saini & Prof. M. P. Singh

Abstract

The study is based on a PhD research work being carried out through the content analysis of LIS job advertisements published in Employment News, University News, and LIS-Links from 2012 to 2017. The job advertisements can be considered as an important source of employment information in a real-time requirement of the job opportunities. It may also help in to serve as a mirror to look in for important updates in the LIS curriculum in changing job market demands of new skills and competencies. In Library and Information Science (LIS), job advertisements have also proven to be an attractive and useful source for research. The result can be useful for the LIS job aspirants looking a career in librarianship in India.

Keywords: *Librarianship, LIS-Professionals, Level of Management, LIS-Education, LIS- Career.*

Introduction

Traditionally, the LIS professionals are reference librarians, catalogers, and serial librarians but now they are transforming as system analysist, metadata librarian, project coordinators, curators, digital librarian, repository manger, informatrician, web-manager, etc. (Park and Marion, 2009). The individuals, those considering LIS as a career are need to be adaptable, determined, constant in time of uncertainty and they also need to keep acquiring new skills and knowledge throughout their career. Since the late 19th Century, the Library and Information Science (LIS) profession have established a compact professional identity and developed important values to guide their actions and goals. However, the growth in the profession occurred incrementally

slow and consequently, the role of librarian remained relatively persistent. Historically, one of the most stable elements was the association of the librarian with the physical library. Even now, one does not usually think of librarians without also thinking of the libraries. The LIS profession has deep roots in the society which is worldwide recognized.

Need of this Study

The rationale of this study is based on the fact (as described by Sharma, 2019) that more than 10000 students pass out every year from the LIS schools in India. This can be considered as a valuable and important human resource for a developing country like India. After completion of the degrees, the next steps involve to find appropriate path for their career options in librarianship and finding a suitable job. Students usually not able to decide whether to look in public, academic or special libraries, what levels of management they approach for getting a job and which profession teaching or practicing librarianship is appropriate where they look for a job in quick time. The study also intent to answer several questions about sectors i.e. public and private where majority of the LIS positions create in Indian environment.

Objectives of the Study

1. To find out the LIS job opportunities on level of education and level of management.
2. To find out the LIS jobs in public and private sectors in India.
3. To explore distribution of the teaching and non-teaching positions in India.

Review of Literature

The analysis of the literature on the job ads studies on the librarians' jobs can be categorized into five major categories. *First,* the most of those studies included job ads from multiple countries, were intended to determine the changing qualifications required of librarians within one country: countries include the United States (Starr, 2004), United Kingdom (Orme, 2008), Australia (Kennan, Willard, & Wilson, 2006; Pamment, 2008), Ireland (Cullen, 2004), and South Africa (Raju, 2014). *Second,* there are studies that addressed specific library sectors. Many studies focused on academic librarianship, while a few targeted special libraries, such as law librarianship (Tice, 2001) and health science librarianship (Cooper & Crum, 2013). Some studies of academic librarianship focused primarily on entry-level positions for those who recently graduated and have no prior library work experience (Reeves & Hahn, 2010). *Thirdly*, specific positions or functional areas in libraries. Cataloguing has

been the most common subject of such research (Khurshid, 2003; Zhu, 2008). Other areas of specialization include serials (Kwasik, 2002), reference (Wang, Tang, & Knight, 2010), collection development, instruction (Gold & Grotti, 2013), outreach (Zhou, 1996) and youth services (White, 1999). *Fourth,* job ad analysis has been conducted to identify the requirements of relatively new development fields or emerging positions. A number of studies published in the early 2000s examined announcements for electronic librarians or electronic resource librarians (Albitz, 2002). In the late 2000s, a large number of papers on metadata librarians (Park, Lu, & Marion, 2009; Han & Hswe, 2010) and digital librarians (Choi & Rasmussen, 2009) appeared. Few studies have been conducted to discover the emerging field of digital data curation (Kim, Warga, & Moen, 2013). *Finally,* particular skills and other requirements for positions have been targeted in a number of job ads studies. Such skills include technology (Mathews & Pardue, 2009), project management (Kinkus, 2007), and management and leadership (Cullen, 2004). Grimes and Grimes's (2008) study is notable as it investigated the requirement for the master's degree in LIS in academic libraries.

Research Methodology Used in the Study

The study is based on the data collected for PhD research for six years from January 2012 to December 2017. The content analysis of the job advertisements published for various positions for the library and information science professional from the three major sources namely Employment News, University News, and LIS links an online blog used for employment information in India.

Discussion, Analysis and Interpretation

The incompleted, overlapped, and missing information of the advertisements were removed from the published job advertisements. The brief summary of the data collected from all the three sources is given in the table 1.

Table 1: Advertisements Processed

Data Sources	Total Ads	2012	2013	2014	2015	2016	2017	Total
University News	Published	118	117	83	97	108	81	604
	Removed	0	2	0	1	2	2	7
	Processed	118	115	83	96	106	79	597
Employment News	Published	138	114	126	107	111	132	728
	Removed	4	6	7	6	4	8	35
	Processed	134	108	119	101	107	124	693

Data Sources	Total Ads	2012	2013	2014	2015	2016	2017	Total
LIS-Links	Published	1099	1591	911	517	745	754	5617
	Removed	418	784	400	194	257	232	2285
	Processed	681	807	511	323	488	522	3332

Analysis in table 1 displays the number of LIS job advertisements processed prior to final consideration for the study, the data collected from all the three sources have processed at the initial stage. The table 1 shows that most of the LIS jobs advertisements have published or uploaded on the online data source i.e. LIS-Links. There were 5617 LIS job advertisements uploaded during 2012-2017 out of which 2285 (40.6%) advertisements were not considered for the study due to the limitation of the study. The table 1 also shows that in both the offline sources i.e. Employment News and University News there were a total of 728 and 604 advertisements published out of which 35 (4.8%) and 7 (1.1%) LIS job advertisements also not considered on the ground of limitation.

Level of LIS Education in India

The different level of education were identified for which job openings created such as the UG degree i.e. Bachelor of Library Science (B. Lib) or Bachelor of Library and Information Science (BLISc.) and the PG degree i.e. Master of Library Science (M. Lib) or Master of Library and Information Science (MLISc.) Singh, 2003. The data pertaining to the level of education obtained from the job ads, is presented in table 2.

Table 2: LIS Job Opportunities based on Level of Education

Education Level	Employment News		University News		Lis-Links		Total Ads		Total Posts	
	Ads	Posts	Ads	Posts	Ads	Posts	Ads	%	Posts	%
M. Lib. I. Sc.	283	378	579	609	1682	2138	2544	55	3125	52.7
B. Lib. I. Sc.	282	391	12	16	1315	1607	1609	34.8	2014	34
Certificate in Lib. Sc.	80	173	5	10	175	352	260	5.6	535	9
Diploma in Lib. Sc.	37	45	1	1	97	127	135	2.9	173	2.9
Ph.D. in Lib. I. Sc.	11	11	0	0	63	70	74	1.6	81	1.3
Total	693	998	597	636	3332	4297	4622		5928	

Source: Level of LIS Education: UGC, 2001; Singh, 2003.

Analysis in table 2 reveals that the majority i.e. 55% (2544) of the LIS job advertisements where 52.7% (3125) of posts were demanded post graduate degree i.e. *Master of Library and Information Science* (*M.Lib. I.Sc.)* from the LIS

job aspirants during the six years covered under this study. In the 34.8% (1609) job advertisements, under graduate degree in the library science i.e. *Bachelor of Library and Inforamtion Science (B. Lib. I. Sc.)* for 34% (2014) posts in LIS job market in India. The table 2 shows that both *UG* and *PG* degrees in the LIS occupied more than 85% of job market in India. The tables 2 also reveals that *Certificate* level of qualifications were published only in 5.6% (260) ads for 9% (535) positions whereas 2.9% (135) ads for 2.9% (173) LIS positions were based on *Diploma* level course in the Library science. As regards to the research degree in LIS i.e. PhD. only 1.6% (74) advertisements in which 1.3% (81) posts were asked the doctoral degree.

Level of Management in LIS Job Opportunities in India

Stoner, Freeman and Gilbert (2015), defined the three level of management which are included in this study for collection of data from the LIS job advertisements. To find out the LIS job opportunities at various levels of management, attempt have been made to find out the LIS jobs under the criteria. The data collected are given in table 3.

Table 3: LIS Job Opportunities and Level of Management

Level of Management	Employment News	University News	Lis-Links	Total	%
Top	75	28	379	482	8.1
Middle	259	466	1071	1796	30.2
First Line	597	37	1127	1761	29.7
Unidentified	67	105	1717	1889	32
Total	998	636	4294	5928	100

Source: Level of Management: **Stoner, Freeman, & Gilbert, 2015**

Analysis in table 3 shows that maximum number i.e. 30.2% (1796) LIS positions were created in the *Middle Management,* while almost equal i.e 29.7% (1761) LIS positions were also generated in the *First Line Management* during the period of study. The table 3 reveals that only 8.1% (482) LIS positions for the *Top Mangement* were published among the LIS job advertisements. As the data in figure 3 indicates that maximum 32% (1889) LIS job positions were *Unidentified* for any of the level of management. Analysis for the *Middle* and *First Line* managements also indicate that almost equal LIS job positions were emerged during the period of the study. However, as far as the top management is concerned, only 8.1% LIS job were appeared among the advertisements for LIS professionals. The data pertained to the level of management can be useful

for the future LIS professionals for deciding their goals of selecting a particular level of management.

LIS Jobs in Public and Private Sector in India

Through the incorporation of ICT applications, the role of Library and Information Science professionals has been developed into several micro fields in libraries. The doors have been opened in every sector there public or private. The study aims to find out the LIS job opportunities in public and private sectors, therefore the data related with the sectors was also collected, the observations obtained through content analysis is presented in table 4.

Table 4: LIS Job Opportunities in Public and Private Sectors

Sectors	Employment News	University News	LIS-Links	Total	%
Central Govt.	817	79	1726	2622	44.2
State Govt.	177	551	1408	2136	36.1
Private	4	6	1160	1170	19.7
Total	998	636	4294	5928	100

Analysis of table 4 reveals that in *Employments News* 81% (817) LIS post were published for the *Central Govt.* LIS jobs while 17.7% (79) of posts were published for the *State Govt.* whereas, only few i.e. 4 posts were appeared for the private sectors. In the *University News* the majority i.e. 86.6% (551) LIS posts were published for the *State Government* during six years. Whereas, 12.4% (79) job from *Central Government* and only just 0.9% (6) post for were published for the *Private Sector* positions. It is observed that in the offline data sources, majority of the LIS job opportunities were created for the *Public Sector* while in the online data source i.e. *LIS-Links* a significant number i.e. 27% (1160) posts were identified for the *Private Sector* LIS job posts. The table 4 shows that most i.e. 44.2% (2622) of LIS jobs were found for the Central Government, while for the *State Government* there were 36.1% (2136) and only 19.7% (1170) posts were published for the *Private Sector*.

LIS Job Opportunities in Different Types of Libraries in India

The study also aimed to find the LIS job opportunities in different types of libraries and information centres in India. It may be useful for the LIS job aspirants in terms of finding appropriate places where they look for LIS job opportunities. The Libraries were categorised in three major types (Kumar, 2002) i.e. Academic, Special and Public Libraries. The data related to types of libraries is presented in table 5.

Table 5: Job Opportunities in Different Types of Libraries

Types of Libraries	Central Govt.	State Govt.	Private	Total	%
Academic	1226	1723	1058	4007	67.5
Special	1362	395	107	1864	31.4
Public	34	18	5	57	1
Total	2622	2136	1170	5928	100

Source: Types of Libraries: Kumar, 2002.

Analysis in table 5 shows that there are 67.5% chances for the LIS job seekers to find their jobs in *Academic Libraries* as the majority i.e. 4007 LIS positions were published for the *Academic Libraries* for both public and private sectors. The 31.4% (1864) LIS positions were also appeared for the *Special Libraries* in which libraries of few special research institutes e.g. AIIMS and IIM libraries were merged. The table 5 reveals that only 1% of LIS positions were published for the *Public Libraries.*

Table 6: LIS Job Opportunities in Various Types of Institutions

Areas	Central Govt.	State Govt.	Private	Total	%	Rank
College	452	898	445	1795	30.2	1
University	744	750	130	1624	27.3	2
Special	962	395	107	1464	24.6	3
School	30	75	483	588	9.9	4
NIT	158	0	0	158	2.6	5
IIT	115	0	0	115	1.9	6
AIIMS	80	0	0	80	1.3	7
Public	34	18	5	57	0.9	8
IIM	47	0	0	47	0.7	9
Total	2622	2136	1170	5928		

Analysis in table 6 shows that 27.3% (1624) LIS positions were demanded in *Colleges* followed by 27.3% (1624) jobs in *Universitie*s whereas, 9.9% (588) LIS positions were published for the *School* level. The LIS positions for the *Special* libraries appeared in 24.6% (1464) posts. The data also shows that in the *Public Libraries* just only 0.9% (57) posts were published during six years. This status of the LIS professionals in *Public Libraries* reveals the real situations of available staff positions in the public libraries in India.

Distribution of LIS Teaching and Non-Teaching Positions

The Indian government made certain provisions through its regulations for the academic and other academic staff in colleges and universities by which the gap between teachers and librarian have reduced up to some extent. Since,

the study aimed to find out the gap between teaching and non-teaching LIS job opportunities for LIS professionals, therefore, the data collected on this aspect is presented in figure 1.

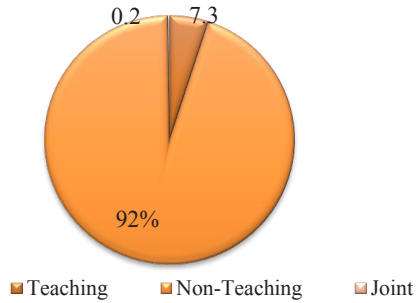

Figure 1: Distribution of LIS Teaching and Non-Teaching Positions

Analysis in figure 1 shows that the majority i.e. 92% (5492) of the LIS posts published during 2012-2017 were the *Non-Teaching* in nature while only 7.3 (436) jobs for the LIS *Teaching* positions were appeared in the LIS job advertisements. During the study, it was observed that few i.e. 0.2% LIS posts were published as '*Joint*' in nature that can be categorised for both the positions. It also shows that in the *Non-Teaching* working area there are greater scope for LIS jobs in India.

Findings of the Study

The study found that the majority of the LIS positions were based on the master's degree in Library & Information Science. Whereas, the Bachelor's degree in LIS also provides significant (34%) opportunities for LIS jobs in India (Ref. Table 2).

The study found that the LIS job opportunities for the *Middle Level Management*, followed by the *First Line Management*. However, a significant number (32.8%) of the post have remained unidentified (Ref. Table 3).

It is found that the majority (80%) of LIS Jobs were created in the Public Sector in which 44% were found in Central Government and 36% were in the State government. Only 20% LIS positions were found in the private sector (Ref. Table 4).

The major working areas where the LIS job aspirant looks for their careers, the study found that in the college and universities, there are many scopes for LIS job opportunities in India. The study found that academic libraries are dominating a large scale of the LIS job market in India. However, the study also found a constant decreasing LIS opportunity in the public libraries (Ref. Table 5).

The study found that the majority i.e. 92% of the total LIS jobs were generated for the non-teaching positions, whereas, only 8% of the jobs for the teaching profession were created in India (Ref. Figure 6).

Conclusion

There are opportunities at every level of management in the library system for the LIS professionals, however, they should focused where they fit and adjust. The result in this study reveals that middle and first line management have greater opportunities for the librarianship. It is also suggested on the basis of the result that the government should increase and create several positions in the public libraries to spread information and support informal education. It is also suggested to the LIS job seekers that they should also focus on the non-teaching posts instead to wait the teaching positions because it covered only 5% and while earlier covered 95% of LIS job market. There are greater LIS prospects for the librarians in the higher educational system especially in colleges and universities those covered 67% of the LIS job market.

The present study also revealed that there is no significance relationship in the eligibility standards and the LIS job opportunities in the private sector. It is suggested that the government should think of provide and strengthen the libraries in the private sector. The study is concludes with an end note that if LIS job aspirants should acquire at least Master's degree in Library and Information Science for prompt and wider scope in their career. In brief, it is stated that the Library and Information Science Profession is a developing discipline that attracting young minds to join establish themselves to contribute to the knowledge and information creation management and preservation and to support the education.

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Citation Analysis of Ph.D. Thesis in Sociology Department at Chaudhary Charan Singh Univsersity Meerut

Dr. Javed Khan & Shama Nafees

Introduction

Citation analysis is worthwhile area of research. "Citation analysis" refers to references in one text to another text, with information on where that text can be found. Citation analysis is useful for understanding subject relationship effectiveness, publication trends, and so on. The first recorded citation analysis was made by Gross and Gross, 1927 who looked at citation patterns to determine the journals to be subscribed to and back volumes to be acquired for the library of Pomona College. They studied the citation frequency in the references given in the journal of the American Chemical Society. With citation analysis one can evaluate and interpret citations received by articles, authors, institutions, and other indications of scientific activity.

(Gupta, Sen 1983) The citation analysis is also a way to understand users. Studying references cited by your faculty's publications or your student's papers shows you the type of sources most commonly used and valued locally in their disciplines. It makes use of bibliographic, references, which are an essential part of scientific communication. Citation analysis is to evaluate and to interpret citations received by articles, authors, Institutions and other aggregate of scientific activities. It is also used as a tool for measuring communication links in sociology and science. Each of any authors cited works 6 along with its citing authors and their papers is arranged in chronological order, which helps the researchers to easily trace developments, since the publication of a particular article by identifying the authors and their papers

related to the primary works (Kumar, N 2002). Citation analysis is a technique of bibliometrics. It is an important research tool understanding the subject, which we analyse the structure and direction of the subject. It measures the utility of documents and relationship between documents in the subject and relationship between authors and their documents.

Review of Related Literature

Chamani Gunasekera (2016) Conduct the study under the title This study analyses the sources cited in 32 post graduate (Master and Ph.D) theses in sociology and economics at University of Peradeniya submitted between 1996 and 2014. The objectives of this citation analysis were to find out the types of cited documents, the chronological distribution and authorship pattern of cited documents in the fields of sociology and economics, and to compare them. K.P. Singh and Bebi (2014) conduct the study under the title the paper presents citation analysis of Ph.D theses submitted in the discipline of sociology of the University of Delhi during 1995-2010. The study is based on the 5766 citations taken out from 25 Ph. D theses of sociology. The study presents analysis of several parameters like authorship pattern, forms of literature, country-wise scattering of citations, distribution of Indian and foreign citations and a ranked list of top 30 cited sociology journals. The study finds that highest number of citations was single authored (83.94 %), and 67.23 % citations were from books and only 22.20 % citations were from journals. The country-wise scattering of citations reveals that 2536 (45.52 %) citations were from India and it was followed by USA and UK. La Bonte, Patsopoulos, Nikolaoes A. (2008) Contect the study under the title explains under the title of "Relative Citation Impact of various study Designs in the Health Sciences: A Citation Study "The main objective of the present study were to determine whether the type of study design affects the rate of citation impact of articles using various study designs-including meta analyses, randomized controlled trials, cohort studies, case control studies, case reports, non-systematic reviews and decision analysis or cost sample of 2646 articles. The finding reveals that more, than 10 citations in the first 2 years were received by 32.4% of Meta-analysis published in 1991 and 43.6% of Meta-analysis published in 2001.

Objectives of the Study

1. To analyze the citation of Ph.D. thesis in sociology.
2. To find out the types of cited documents.
3. To find out the chronological distribution of the cited thesis.
4. To find out the Subject wise pattern of cited thesis.
5. To find out the language-wise distribution of cited thesis.

Research Methodology

The data collected through secondary sources. There are about 32departments in CCS University, but the sample has been collected only from sociology Departments were taken for the study. "The study Citation Analysis of Ph.D. Thesis in Sociology Submitted to Ch. Charan Singh University Meerut" The local no of citation thesis collected from the library and covering the time period of 10 years i. e. from 2005-2014.

Data Analysis & Interpretation

A total 4643 of citations were collected from the 34 doctoral theses of sociology which are submitted in sociology department in CCS Meerut from 2005-014. These citations formed the basis of the citation analysis and interpretation.

Table 1: Language Wise Distribution of Thesis/ Book

S. No.	Language	Frequency of Occurrences	Frequency of %
1.	English	28	82.35
2.	Hindi	6	17.65
	Total	34	

Table 1. shows that in most of the theses submitted in English language from 2005-2014. Out of 34 theses 6 (17.65%) theses are submitted in Hindi language.

Table 2: Form Wise Distribution of Literature

S. No.	Sources	Frequency	% age freq.	Cumu. 7% age
1.	Books	1211	82.26	82.26
2.	Journals	200	13.58	95.85
3.	Reports	7	0.47	96.31
4.	Review	12	0.81	97.12
5.	International Rev.	1	0.06	97.18
6.	Ph.D Theiss	16	1.08	98.26
7.	Websites	24	1.63	99.89
8.	Seminar	1	0.06	99.95
	Total	1472	99.95	

From the table it is evident that the books have the highest number of citations, books (82.26%) means that the researcher in the field of this subject for the information uses by them. Journals are the second highest group (13.58%), followed by website (1.63%) followed by Ph.D Thesis (1.08%), followed by

Review (0.81%) followed by Reports (0.47%) and followed by Seminar and International Review (0.06) of the total respectively.

Table 3: Year-wise distribution of theses

Time Span	No. of Ph.D theses submitted	Percentage
2005	2	5.88
2006	5	14.70
2007	1	2.94
2008	1	2.94
2009	5	14.70
2010	5	14.70
2011	4	11.76
2012	7	20.58
2013	3	8.82
2014	1	2.94
TOTAL	34	100

The Table 3 Shows that CCS the highest number of theses, ie 7are awarded in the year 2012, while the lowest number of 1 thesis are awarded in the year 2007, 2008 and 2014. It is also noted that 5 theses (14.70%) are awarded in the years 2006, 2009 and 2010.

Table 4: Distribution of Authors

Rank	Pattern of Authorship	Freq. of Occurrence	Frequency of %	Cumulative Percentage
1	Single Author	4098	88.26	88.26
2	Double Author	511	11.00	99.26
3	Triple Author	28	0.60	99.86
4	More Than	5	0.107	99.96
5	Corporate Author	1	0.02	99.98

Show's that single authorship is 4098 forming 88.26% of the total no citation in the field. Double authorship placed on second rank with 511 forming 11 % of the total. The last rank was occupied by cooperate author.

Table 5: Country Wise Distribution of Books

S. No.	Name of Country	Frequency of occurrence	% age Frequency	Cumulative %age of freq.
1.	National	912	76.89	76.89
2.	International	274	23.10	99.99
	TOTAL	1186	99.99	

Table 5. shows that the geographical distribution of books wise analysis of most of the books forming 76.89% national from the total no of publication. And the international 23.10% is the most productive distribution books.

Table 6: Decade Wise Published Thesis

S. No.	Period of Origin	Frequency of Occurrences	% age of frequency	Cumulative % of Frequency
1.	1950- 1960	63	3.88	3.88
2.	1960- 1970	180	11.09	14.97
3.	1970- 1980	376	23.18	38.15
4.	1980- 1990	425	26.20	64.35
5.	1990- 2000	328	20.22	84.57
6.	2001- 2010	250	15.41	99.98
	Total	1622	99.98	

It can be observed from table that 26.20% of the citations were of the period ranging from 1980-1990. The maximum numbers of documents were published during the year 1970-1980 (23.18) the maximum appeared in the year 1990-2000 (20.22).

Findings and Conclusion

1. The maximum numbers of Ph.D theses are submitted by the researcher in English Language.
2. The researchers in the field of psychology are consulting books which have highest no. of citation, books 1211 (82.26%) of the total. Journals are the second higher group 200 (13.58%).
3. Table shows the year wise submission of Ph.D theses in the Department of Psychology at CCS University during 2005-2014.
4. The majority of books i.e 4098 (88.26%) have been produced by single authors, followed by team of 2 authors, i.e 511 (11%) and so on.
5. The most productive country of books National which has highest number of citations, 76.89%.
6. The maximum numbers of books are published in the decade 1980-1990, i.e., 425 (26.20%) and the minimum in the decade 1950-160 i.e. (3.88%).

Conclusion

Citation analysis is a tool of bibliometric study of literature based upon some degrees of relationship between citing and cited documents. It is an analysis of documents, journals author publication, year etc., which is used by citing author. It is established relationship between citing and cited articles and

documents. Today, citation analysis is more important for scientists because it is prepared list of frequency of citation and gives more emphasis on the subscription of journals and documents.

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Uses and Level of Satisfaction of e-Resources of Selective Universities of Gwalior

Dr. Nidhi Srivastava, Dr. Ramnivas Sharma & Dr. Manoj KumarTiwai

Abstract

The article aims to study the use of electronic resources among selective university students of Gwalior. A total of 256 responses to the questionnaire were received e. This study highlights the different types of electronic resources used by respondents, their frequency of use of electronic resources, the purpose of the use of electronic resources, the time they devote to it as well as the search for the device. access to electronic resources.

Keywords: *E-resources, Purpose of E-resources, utilization of e-resources, Accessing mode, case study.*

Introduction

Electronic resources are nothing more than electronically accessible material such as electronic journals, electronic books, electronic theses, electronic dictionaries, electronic data archives, electronic research reports, electronic bibliographic databases, compact discs, websites, etc. numerical format. They have become more prevalent with the emergence of covid-19 for knowledge management, especially in academic requirements. Gwalior, the city of knowledge is the hub of reputable universities / educational institutions. Our survey is based on the use of electronic resources among students in this region.

Review of Literature

Thanuskodi (2012) aimed to find the use of electronic resources by PG students and researchers at the Faculty of Arts at Annamalai University. In his study, he found that the majority of users are aware of the availability of electronic resources. He also mentioned that 47.78% of respondents went to access electronic resources, only 32.78% use printed materials.

Anjana (2016) defined e-resources, objectives of e-resources, types of e-resources. His article aims to examine the benefits of electronic resources in higher education.

Significance of the Study

The paper aims to study the level of use of electronic resources among students of these universities.

Objectives of the Study

1. Examine knowledge of electronic resources.
2. Identify the purpose of using electronic resources.
3. List the preference factors for electronic resources.
4. Find favorite electronic resources.
5. Know the frequency of use of electronic resources.
6. Analyze the mode of electronic resources.

Methodology

Primary data was collected from various categories of students via physical forms and Google. In total, we obtained 256 respondents.

Data Analysis

The data was analyzed using Microsoft Excel. The results have been presented in the form of tables, bar charts and pie charts for ease of understanding.

Table 1: Gender wise Respondents

Gender	No. of Respondent	Percentage
Male	137	53.52
Female	119	46.48
Total	256	100

Table 1 clearly indicates that 53% of men and 46% of women responded to this survey.

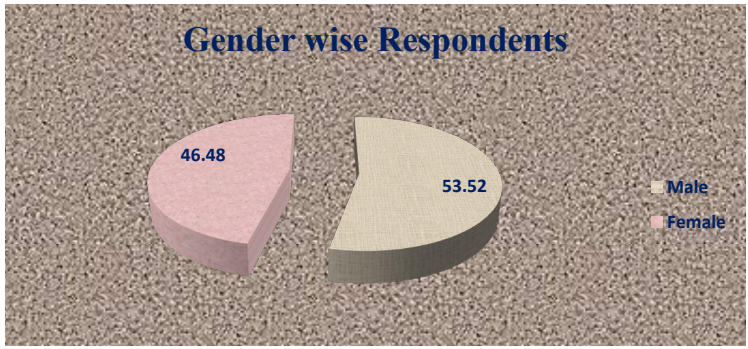


Table 2: Age wise Respondents

Gender	No. of Respondent	Percentage
Below 20 years	35	13.68
20 to 25 years	59	23.04
25 to 30 years	73	28.52
Above 30 years	89	34.76
Total	256	100

Table 2 and Figure 1 show that 34% of respondents are over 30 years old and 73% of respondents are between 25 and 30 years old.

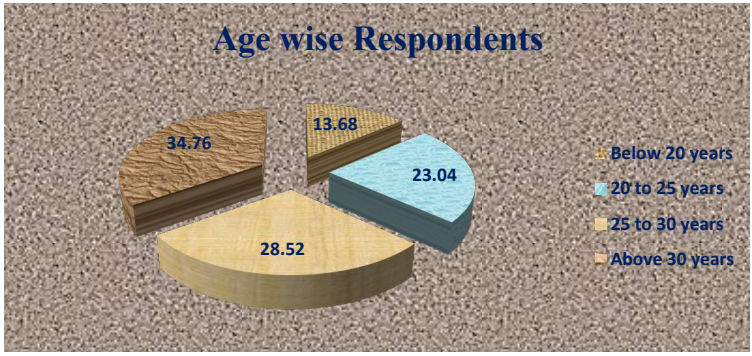


Table 3: Educational Qualification of Respondents

Gender	No. of Respondent	Percentage
U.G.	16	6.26
P.G.	45	17.58
M. Phil	89	34.76
Ph. D.	101	39.45
Others	5	1.95
Total	256	100

Table 3 clearly indicates that 39.45% of the respondents are doctoral students and 34.76% of the respondents are M. Phil students.

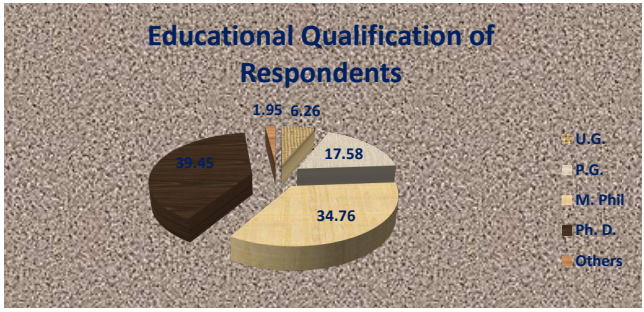


Table 4: Preferred Educational Material

Type of Material	Frequency	Percentage
e-resources	147	57.43
Printed Material	98	38.28
Both	11	4.29
Total	256	100

Table 4 explains that 57% of respondents study through electronic resources. 98% of respondents use printed media such as books, magazines and 11% use both.

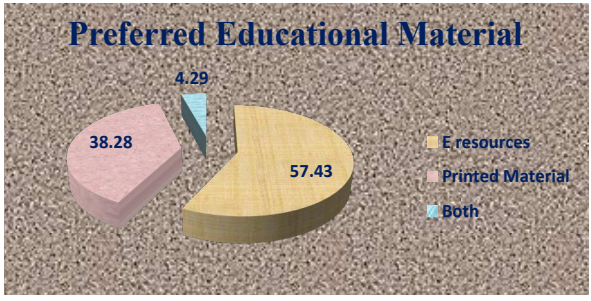


Table 5: Level of Satisfaction of surfing e-Resources

Type of Material	Frequency	Percentage
Highly Satisfied	203	79.30
Partially Satisfied	50	19.53
Not Satisfied	3	1.17
Total	256	100

Table 5 and Figure 2 indicate that the level of satisfaction with electronic resources among 60% of students is partial and 8% of respondents are not satisfied.

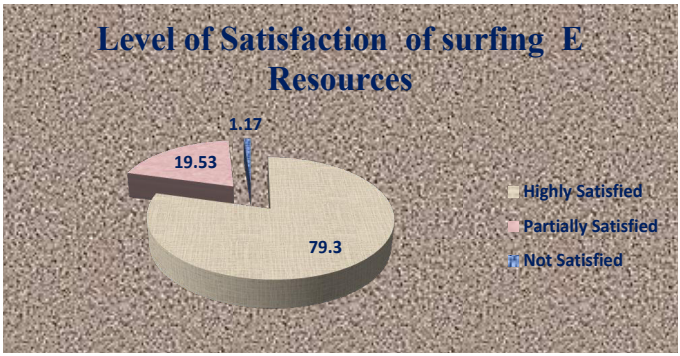
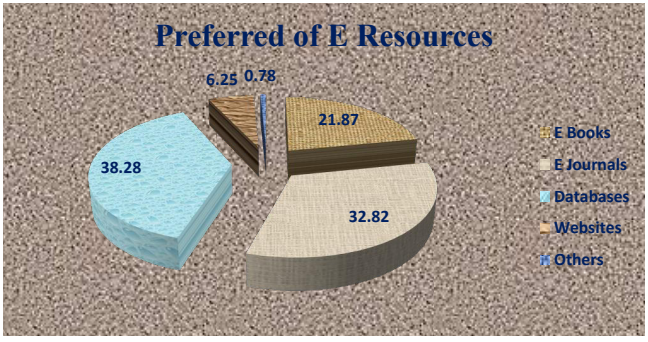


Table 6: Preferred of E Resources

Type of Material	Frequency	Percentage
E Books	56	21.87
E Journals	84	32.82
Databases	98	38.28
Websites	16	6.25
Others	2	0.78
Total	256	100

Table 6 and Figure 3 clearly show that 38.25% of respondents prefer databases, 32.82% of respondents prefer electronic journals and only 2% of respondents prefer others.



Findings

Here are some of the findings below:

1. E resources are mainly used.
2. Databases are mostly electronic resources preferred by respondents.

3. Most respondents are very satisfied with electronic resources.
4. Most doctoral students use electronic resources for their studies and to prepare their work.
5. Most respondents prefer electronic resources online rather than offline.

Conclusion

Today we are in a tremendous growth of literature. Electronic resources also play an essential role. From this study, the growth is clearly visible with the paradigm shift of the stereotypical attitude towards electronic resources. Electronic resources are very useful to save us access time and also to give us up-to-date knowledge.

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Information Seeking Patterns of the Library Users in Technical Educational Institutes in Delhi Region: An Evaluative Study

Dr. Javed Khan & Versha Bharadwaj

Introduction

"Information seeking is a conscious effort to acquire information in response to a need or gap in your knowledge"

According to **Wilson (1999)**, information seeking behavior results from the recognition of some need, perceived by the user. That behavior may take several forms: the user may make demands upon formal systems that are services, information centers; or upon systems which may perform information function in addition to primary, non-information functions such as estate agent's offices or car sales agencies that give current information of their field viz., prices and models etc. The user also seeks information from other people which is otherwise called information exchange. According to him the word 'exchange' is intended to draw attention to the element of reciprocity, recognized by Sociologists and social Psychologists as a fundamental aspect of human interaction. In the process failure may be experienced with systems as well as when seeking information from others. Use of information according to him is evaluation to discover its relation to the user's need.

Concept of Information Needs and Seeking Behavior: Information seeking behavior refers to those activities a person engages in when identifying his or her own need for information, searching for such information in any way and using or transferring of information. Information behavior is the totality of human behavior in relation to the sources and channels of information, including both active and passive information seeking and information use.

Thus, it includes face to face and online communication with others as well as the passive reception of information. Information seeking behavior involves personal reasons for seeking information, the kinds of information which are being sought and the ways and sources with which needed information is being sought. Information seeking behavior is expressed in various forms, from reading printed material to research and experimentation. Scholars, students and faculties actively seek current information from the various media available in libraries, for example encyclopedias, journals and more currently, electronic media.

Models of Information Seeking Behavior

1. Stigler's Model of Optimization
2. Simon's Model of Satisfaction to information Seeking
3. Krikelas's Alternative Model to Information Seeking
4. Mick's Individual Behaviour Model
5. Robert's Information- Man Model
6. Ellis Behaviour Model
7. Wilson's Work role' model
8. Kuhlthau
9. Marchionini's Model (1992)
10. Bates Model (1989)
11. Guthrie and Dreher's Model

Review of Literature

Orlu, Aondoana Daniel (2016) conduct the study under the title "Information Seeking Behaviour of Masters Students: Affective and Behavioural Dimensions" expressed that, the current study seeks an in-depth understanding of the emotions and behaviour associated with information seeking among Masters Students. Essentially, this does not intend to identify relationships between variables. Rather, it seeks to understand the emotional responsible to the search for information. Interview questions were designed to lead interviewees through the stages of their search, including search during proposal development, research design and thesis writing. Interviews were recorded, transcribed and analysed using thematic analysis. Findings of the study confirm that the information seeking behaviour among masters students is organized, and in some cases, random. **Meyer, Anika, and Fourie, Ina (2016)** conducts the study under the title "Collaborative information seeking environments benefiting from holistic ergonomics" explored the value of utilising a holistic ergonomic approach, covering engineering, cognitive and social perspectives, to cultivate beneficial and productive collaborative

information seeking (CIS) systems and environments, specifically with regard to three main CIS pillars (control, communication and awareness). A qualitative research approach, based on a selective corpus of CIS literature, was utilised to perform a content analysis to note if terms and concepts normally associated with engineering, cognitive and social ergonomics can be used to eliminate terms reflecting issues related to three CIS pillars (control, communication and awareness) that can benefit from a holistic ergonomic approach. **Paliwal, Sangeeta, Bhardwaj, Mukul and Sharma, Swadesh (2016)** conduct the study under the title "Information needs and information seeking behaviour of faculty members of science and technology, G.G. Nagar District: A study" The progress of modern society depends a great deal, upon the provision of the right kind of information in the light form at the right time. As information is valuable, it must be put to proper use. In order to serve the users efficiently and effectively, one must ascertain the needs of users in terms of information requirement. Information is a power full instrument in society and plays a significant role in proving the quality of lode of individual. **Aondoana Daniel Orlu (2016)** the study aimed at broadening the appreciating "Information seeking behaviour of master's students: Affective behavioural dimensions" through linking the dynamics of information seeking to emotions and behaviour. The current study seeks an in-depth understanding of the emotions and behaviour associated with information seeking among Masters Students. Essentially, this does not intend to identify relationships between variables. Rather, it seeks to understand the emotional responsible to the search for information. Consequently, the study follows a descriptor-explanatory design that involves the description of the phenomenon through a review of literature and explanations of such occurrence through primary data collected via interviews with participants.

Objectives of the Study

1. To assess the awareness of the users regarding services provided by the library
2. To identify the user's strategy for searching information.
3. To determine the problems faced by the users while seeking information.
4. To identify the factors that influences the users' information needs and information seeking behavior.

Research Methodology

The data will be collected of the library users from the Technical Educational Institutes in Delhi region. There are about 2000 users under researcher has to take 15% from the total Population as a sample techniques 250 users from

the different Technical Educational Institutes will be taken as a sample of the study, which will include 100 Post Graduate, 100 Under Graduate, and 50 Faculty Members in Each Institute.

Data Analysis and Interpretation

Aware about the following types of services available in the library

S. No.	Variables	IIT DELHI						JMI					
		PG N=78	%	RS N=68	%	FM N=31	%	PG N=81	%	RS N=75	%	FM N=35	%
1	Reference Service	59	75.64	57	83.82	21	67.74	58	71.60	49	65.33	19	54.28
2	ILL	46	58.97	42	61.67	22	70.96	42	51.85	47	62.66	20	57.14
3	OPAC facility	56	71.79	48	70.58	25	80.64	44	54.32	47	62.66	24	68.57
4	CD-ROM facility	27	34.61	33	48.52	19	61.29	22	27.16	25	33.33	14	40
5	Microfilm	13	16.66	16	23.52	8	25.80	12	14.81	10	13.33	9	25.71
6	CA S	23	29.48	27	39.70	14	45.16	20	24.69	23	30.66	11	31.42
7	Photo copying	66	84.61	58	85.29	26	83.87	71	87.65	67	89.33	29	82.85
8	Abstracting & Indexing Service	12	15.38	14	20.58	9	29.03	9	11.11	10	13.33	8	22.85
9	Internet Service	56	71.79	58	85.29	28	90.32	51	62.96	56	74.66	25	71.42

S. No.	Variables	DTU						NSIT					
		PG N=87	%	RS N=78	%	FM N=33	%	PG N=83	%	RS N=71	%	FM N=34	%
1	Reference Service	51	58.62	46	58.97	17	51.51	44	53.01	47	66.19	16	47.05
2	ILL	41	47.12	39	50	20	60.60	39	46.98	42	59.15	20	58.82
3	OPAC facility	40	45.97	44	56.41	23	69.69	42	50.60	48	67.60	24	70.58
4	CD-ROM facility	18	20.68	20	25.64	12	36.36	17	20.48	16	22.53	17	50
5	Microfilm	12	13.79	11	14.10	7	21.21	13	15.66	10	14.08	7	20.58
6	CA S	18	20.68	14	17.94	6	18.18	16	19.27	13	18.30	6	17.64
7	Photo copying	73	83.90	65	83.33	30	90.90	70	84.33	60	84.50	22	64.70
8	Abstracting & Indexing Service	9	10.34	11	14.10	8	24.24	10	12.04	9	12.67	6	17.64
9	Internet Service	55	63.21	57	73.07	23	69.69	49	59.03	52	73.23	23	6764

Multiple Answer Were Permitted

Table no. shows the awareness of various library information services among the respondents. The table shows that the majority of Postgraduates of (84.16%) Photocopy services and (75.64%) Reference services are aware these types of services in the IIT library. JMI Postgraduate is respondents (87.65%) Photocopy and (71.60%) Reference services are aware provided by the library. DTU (83.33%) Photocopy services and Reference services and (58.62%) are respondents of the library. NSIT users are also aware (84.50%) Photocopying and (53.01%) of Reference services provide by the library. On the other hand Research Scholar of IIT (85.29%) Photocopy services and (83.82%) of Reference services are provided by the library. JMI (89.33%) Photocopy and Reference services (65.33%). DTU users are aware (83.33%) Photocopy and (58.97%) of Reference services. NSIT library users (84.50%) Photocopy services and (67.60%) OPAC Facilities are also aware of the library users. Faculty members of IIT library are also aware (83.87%) Photocopy services and (80.64%) users are aware OPAC Facilities. JMI Users (82.85%) are also aware Photocopy services and Reference services 968.57%). And other hand DTU library users (90.90%) Photocopy and (69.69%) OPAC services are also aware of the Faculty Members. NSIT Faculty members are aware (70.58%) OPAC facilities and (64.70%) are aware Photocopy services provide by the library.

Method Used for Locating Information

The purpose of using method for location information resources varies among respondents according to their information requirements. The table 2 depicts the purpose of using methods. The purpose of using methods by majority of postgraduates of IIT (32.05%) consults the library catalogue. JMI Postgraduates users are (30.86%) Ask the library staff. And other hands (31.03%) of DTU users are also locate information for library staff. NSIT library user using methods for locate information (31.32%) for searching document yourself. Research scholars of IIT (42.64%) searching the document yourself. And JMI users (36%) consult library catalogue. DTU library users (38.46%) and NSIT (32.39%) are also searching document yourself. Faculty members of IIT (45.16%) are searching document yourself. But other hand JMI faculty members (45.71%) and DTU (39.39%) and NSIT faculty members (38.23%) are also using for locate information consult the library catalogue.

S. No	Variables	IIT DELHI						JMI					
		PG N=78	%	RS N=68	%	FM N=31	%	PG N=81	%	RS N=75	%	FM N=35	%
1	Search the shelves yourself	23	29.48	29	42.64	14	45.16	22	27.16	24	32	12	34.28
2	Ask the library staff	17	21.79	9	13.23	5	16.12	25	30.86	16	21.33	6	17.14
3	Consult the library catalogue	25	32.05	23	33.82	12	38.70	18	22.22	27	36	16	45.71
4	Take the help of a friend Colleague	13	16.66	7	10.29	--		16	19.75	8	10.66	1	2.85

S. No	Variables	DTU						NSIT					
		PG N=87	%	RS N=78	%	FM N=33	%	PG N=83	%	RS N=71	%	FM N=34	%
1	Search the shelves yourself	23	26.43	30	38.46	12	36.36	26	31.32	23	32.39	12	35.29
2	Ask the library staff	27	31.03	13	16.66	6	18.18	22	26.50	14	19.71	8	23.52
3	Consult the library catalogue	19	21.83	24	30.76	13	39.39	22	26.50	23	32.39	13	38.23
4	Take the help of a friend Colleague	18	20.68	11	14.10	2	6.06	13	15.66	11	15.49	1	2.94

Problems Face while Accessing Electronic Resources

S. No.	Variables	IIT DELHI						JMI					
		PG N=78	%	RS N=68	%	FM N=31	%	PG N=81	%	RS N=75	%	FM N=35	%
1	Information Over Load	46	58.97	42	61.76	20	64.51	39	48.14	32	42.66	23	65.71
2	Lack of IT knowledge and skills	11	14.10	7	10.29	3	9.67	12	14.81	9	12	3	8.57
3	Limited access to computers	15	19.23	13	19.11	5	16.12	17	20.98	23	30.66	6	17.14
4	Lack of power supply	3	3.84	3	4.41	1	3.22	6	7.40	5	6.66	1	2.85
5	Slow Server	3	3.84	3	4.41	2	6.45	7	8.64	6	8	2	5.71

S. No.	Variables	DTU						NSIT					
		PG N=87	%	RS N=78	%	FM N=33	%	PG N=83	%	RS N=71	%	FM N=34	%
1	Information Over Load	35	40.22	28	35.89	18	54.54	31	37.34	18	25.35	18	52.94

S. No.	Variables	DTU						NSIT					
		PG N=87	%	RS N=78	%	FM N=33	%	PG N=83	%	RS N=71	%	FM N=34	%
2	Lack of IT knowledge and skills	16	18.39	13	16.66	4	12.12	20	24.09	14	19.71	5	14.70
3	Limited access to computers	19	21.83	24	30.76	7	21.21	22	26.50	23	32.39	7	20.58
4	Lack of power supply	8	9.19	6	7.69	2	6.06	9	10.84	7	9.85	1	2.94
5	Slow Server	9	10.34	7	8.97	2	6.06	10	12.04	9	12.67	3	8.82

Problem faces while accessing electronic resources by different categories of users is shown in table **no 3.** The Table depicts that all the respondents' face problem but the problems vary from user to users. It is clear from the table that the majority of Postgraduate respondents of (58.9%) IIT and JMI users (48.1%) and DTU users (40.2%) and (26.43%) of NST users face problem of information over loaded. On the other hand Research scholars in IIT (61.7%) and DTU (35.8%) JMI library users (42.6%) face problem of information over loaded while the users of NSIT (32.3%) face problem due to limited access to. Faculty members of IIT library users of (64.5%) IIT and JMI users (65.7%) and DTU users (54.5%) and (52.9%) of NST users face problem of information over loaded.

Influence of Web-resources on Efficiency

S. No.	Variables	IIT DELHI						JMI					
		PG N=78	%	RS N=68	%	FM N=31	%	PG N=81	%	RS N=75	%	FM N=35	%
1	Improves the research process	9	11.53	16	23.52	11	35.48	8	9.87	12	16	14	40
2	Improves professional competency	25	32.05	14	20.58	3	9.67	24	29.62	21	28	4	11.42
3	Access to up-to-date information	24	30.76	17	25	10	32.25	28	34.56	18	24	8	22.85
4	Access to wide range of information	20	25.64	21	30.88	7	22.58	21	25.92	24	32	9	25.71

S. No.	Variables	DTU						NSIT					
		PG N=87	%	RS N=78	%	FM N=33	%	PG N=83	%	RS N=71	%	FM N=34	%
1	Improves the research process	6	6.89	18	23.07	10	30.30	7	8.43	13	18.30	11	32.35

S. No.	Variables	DTU						NSIT					
		PG N=87	%	RS N=78	%	FM N=33	%	PG N=83	%	RS N=71	%	FM N=34	%
2	Improves professional competency	22	25.28	17	21.79	3	9.09	21	25.30	16	22.53	4	11.76
3	Access to up-to-date information	27	31.03	21	26.92	9	27.27	26	31.32	25	35.21	8	23.52
4	Access to wide range of information	32	36.78	22	28.20	11	33.33	29	34.93	17	23.94	11	32.35

Influence of web resources on efficiency of different users is shown in table **no 4** The Table depicts that all the respondents 'are influenced by web resources but it varies from user to users. It is clear from the table that the majority of Postgraduate respondents of (32.5%) IIT users use web resources to improve the research work and JMI users (34.5%) access to up-to-date information and DTU users (36%) and (34%) of NSIT users Access to wide range of information. On the other hand, Research scholars in IIT (30.8%) and DTU (32%) JMI library users (28.2%) Access to wide range of information while the users of NSIT (35.2%) Access to up to date information Faculty members of IIT library users of (32.2%) IIT Access to information and JMI users (40%) improves the research process and DTU users (33.3%) and (32.3%) of NST users Access to information as well as improves the research.

Findings Conclusion and Suggestions

Findings

Based on the analysis of the data the following findings are arrived which are as follows:

1. It was found that users are aware of library services.
2. Majority of the users locating information by consult the library catalogue.
3. Majority of the users are facing problem while accessing electronic resources for information over load.
4. It was found that the web resource influences the users in access to up-to date information and improves the professional competence.

Conclusion

The study sought to examine the Information seeking behaviour of IIT DELHI, JMI, DTU, and NSIT. The data of the survey was collected through a structured questionnaire to get an overview on the Information seeking behaviour of Post Graduates, Research Scholars and Faculty Members of both the faculties. Survey result shows that the Information seeking is very essential part of library user's study. It provides great help in conducting

their researches. Most of the research scholars are satisfied with sources/ collection of the library, while some of them are not so much satisfied but the overall result are satisfactory and it is revealed that research scholars and faculty members of IIT DELHI, JMI, DTU, NSIT are more satisfied with the information obtained on the library collection.

Suggestions

1. Everybody should visit library every day because it is the best source of collecting information.
2. The University Library should also subscribe e-journals in every field, print as well as non-print.
3. Some important books are available as single copies so for these important books number of copies should be bought so that the students should not face any problem.
4. Library should provide latest journals and books to the library users.
5. Reference collections like encyclopaedia, bibliography and abstracting and indexing services should be in CD-ROM also besides bound volumes, for better and effective utilization.
6. Library should subscribe consortium in the library.

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Library Profession: A Lifetime Kalpavriksha for the Masses

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Abstract

The library profession is a noble profession, and the librarian is also called the teacher of the teacher. The library provides information to everyone from the general class to professional experts. The government also helps in this direction, because just like food, clothes, and house, knowledge and information is also the primary need. However, the library as a social organization needs to be updated with the changing flow of time to maintain its dominance. This means that the use of technology in the library is inevitable which simplifies every task with savings of time, energy and money and satisfies the needs of most of the users, because the guru mantra of modern library is, "everything is possible with just one click." Library services have changed dramatically through various generations of libraries such as Library 1.0, Library 2.0, Library 3.0, Library 4.0 and with the help of emerging technologies, future libraries are becoming increasingly user-oriented. It means anytime, anywhere, and any resources can be accessed of the library. Thus, in this chapter, an attempt is made to present the trend of future libraries.

Keywords: *Library, Social Institutions, Social Development, Cultural Development, Economic Development, Emerging Technology, Modern Infrastructure, A People's University*

Introduction

It is essential that every class of society is educated. Various efforts have been made by the government to develop the education sector and to increase the spread of education. In which the libraries are the most prominent

contributors because it makes an important contribution to both formal and informal education. The library is considered to be the heart of the country's education system. The library plays an important role in social, economic, educational, and cultural development in any nation. Today the libraries are known not only as of the library but in synonyms such as the Information Center, Information Analysis Center, and Referral Center. This organization performs many functions like Acquisition, Classification, Cataloguing, Circulation, Serial Control, Information Analysis, etc. For that, he has an educated, professionally qualified, and trained employee. The ideology of today's library has changed from that of a traditional library. Due to the development of science and technology, digital libraries, virtual libraries, electronic libraries, paperless libraries, and libraries without walls exist today where network and internet facilities are provided round the clock. The National Education Policy, formulated in 1985 and 2020 had also recommended the use of IT to provide advanced and essential library services. That is why we can say that the past of libraries was glorious, the present is a guide and the future is bright. Continuing advances in technology at the present time, as well as global epidemics such as COVID-19, have come and gone, yet libraries are still in demand and this demand is not over. This means that libraries are constantly evolving to adapt to changing times, accepting every challenge and continuing to make progress so that they can make a unique contribution to the formation of an educated society.

Librarianship is also considered a profession, as it possesses the following basic characteristics:

1. A body of knowledge imparted in LIS schools
2. Intensive training and continued practice to gain mastery over the skills for knowledge organization and retrieval
3. Oriented towards service to the society
4. Associations to bind the professionals
5. Standard terminology and practices
6. Code of ethics

So, the primary purpose of the LIS profession is to provide access to information to the right user at the right time at the right place in the right manner. That is, it aims to fulfill social responsibility.

Meaning

In ancient times, the library was also known as Dharmganj, Granthkuti, Kitabkhana, Pothikhana Saraswati Bahndar, Vanchanalay, and Pushtakalay. While in the modern period, it is also known as Resource Center, Learning Center, Information Center, Documentation Center, Information Analysis

Center, Referral Center, virtual library, Paperless library, and library without walls.

If we try to know the meaning of library in terms of grammar,

Granth + Aalay (House)

Pushtak + Aalay (Building)

Granth + Lay (To become immersed)

Thus, grammatically, a library means a place where books are kept or a place where readers become engrossed in reading.

Definition

The definition of the corresponding library of the aforementioned meaning can be described as follows:

A collection of printed material is called a library where it is stored or arranged in order for the purpose of education, reading, or both. However, the present time is the time of IT and IT means information technology. In simple words, we can say that IT is the synchronization of computers, microelectronics, and telecommunication. If we try to talk about IT-based libraries then it can be said that, every instruction and information in the IT environment libraries is in digital or electronic form which is stored in electronic journals, electronic books, online databases, CDs, DVDs, online dictionaries, online encyclopedias, etc., as well as data, voice, animation, graphics, etc. The use of these libraries is seen by more and more individuals.

Main factors to the development of the library profession

Food, clothing, and shelter are the basic necessities for a social animal, through which a happy human life begins. In this way, information is a basic human need for healthy, independent, and individual thinking through which personal development, formation of modern society, and development of the country are possible. Considering the above, where to get the information is an important question. The library is the only option as a unique and extraordinary place to get information and the development of the current form of libraries is not only brief but also the result of many years of effort. Thus, libraries have a unique contribution to social, cultural, economic, and human development. The following are important factors in the development of libraries.

- Literacy
- Universal public education
- Development of Science & Technology
- Knowledge of utility of library
- Library legislation

- Various types of libraries according to user's demand
- The library is a free facility
- An auxiliary educational institution Etc.

As a result, the library can be considered as a people's University, Magical Chirag of Aladdin, Kamdhenu Cow, or Akshaypatra.

History of the development of the library profession in an emerging perspective

The development of libraries and their developmental activities are mainly before and after independence. How can libraries be partners in the social, cultural, and economic development of a society? For that, if we talk about the pre-independence period, it can be said that a public library was established in Calcutta, India, and it was attached to the Royal Library in 1903 which now functions as the National Library of India.

In the year 1910, the king of Baroda, Sayajirao Gaekwad-3 invited the American Librarian W. A. Borden to take responsibility for the social education of the community. On his advice, a central library, a district library, and town libraries were set up in the district of Baroda, and training courses were also started for the library staff. Thus, before independence, 1500 libraries were opened in the state of Baroda at various levels.

In addition, another American librarian was called by the Punjab University in 1912, who advised o improve the standard of the library and to start library training in Punjab. Thus, important contribution was made to the social level of libraries in India. Apart from this, the contribution of Dr. S. R. Ranganathan (Father of Library Science) is also significant. In connection with the Five-Year Plan, in the post-independence period, efforts were made to emphasize activities like library structure, library management, library act, library acceleration training programs, staff training, etc.

Thus, continuous efforts are being made for the development of the library and library profession.

Role of library profession in social development

As the library functions as a social institution. Here information and knowledge are created, stored, processed, managed, and distributed. As a social organization, it includes the following:

1. The library is functioning as a public university.
2. The library combines education.
3. The library brings social solidarity.
4. The library is a supplement to school education.
5. The library provides excellence for reading.

6. The library is a comprehensive development tool for society.
7. The library provides knowledge to subject matter experts.
8. The library works to preserve the knowledge heritage and communicate it to the new generation.
9. As a social organization, a library follows each of the following functions:
10. The process of Selection, Acquisition, Classification, and Cataloguing of reading materials
11. The process of creating membership and circulate reading materials to them
12. The process of Appointing a trained employee to provide various tasks and services
13. The process of Organizing public relations, publicity, and dissemination services periodically in the libraries
14. The process to develop the library as an information center through the information service, reference service, and documentation service
15. The process to provide services like abstracting, indexing, reprographic, translation, resource sharing, document delivery

In this way, the library has taken the responsibility to provide lifelong self-education to everyone in society as a social organization.

Role of library profession in cultural development

Intellectual development is also essential for the holistic development of human beings as well as for physical recreation. The library also expands the intellectual level of the common man, as well as the general knowledge level of the average human being. An interesting reading of the library's reading material sources brings a culturally high level of education to society; so the role of libraries in the cultural field is very important.

In particular, various programs and various reading materials on it such as general reading, reading of subjects, music, fine arts, book exhibitions, formal and informal exhibitions, various day celebrations, plays, meetings, seminars, group discussions, adult education, night classes Etc. which is available in the library not only in printed form but also in a non-printed form such as microfiche, microfilm, gramophone records, audio-video materials, movies, visual content, computers, networks, Internet, etc.

Thus, the library not only provides information about curriculum, education, and research but also promotes trade, commerce, industry activity, recreation, and intellectual awareness, i.e., it is useful to society from every point of view. To provide a missing link in one's life, especially for those whose education and training is exceptional, to make humorous presentations in

speeches or discourses at meetings, to increase the knowledge of scientists, and so on. Thus, there is an inexhaustible store of all information and entertainment etc. In this way libraries also contribute to cultural development.

Role of library profession in economic development

Now a day's we will agree with this statement, that "information is a saleable commodity". For example, professionals like Doctors, Engineers, Consultants, businessmen, teachers, etc. receive income in exchange for information and the experience and skills they have. So here the library's contribution is at the forefront.

The role of industries and professional development in the important economic development of any country is important. The development of these industries is dependent on the latest, high technology and mechanical equipment. Many developing centers related to industries in developing countries like India have been established. The main examples of which are Physical Research Institute (PRL), Indian Space Research Organization (ISRO), Ahmedabad Textile Industry's Research Association (ATIRA), Indian National Science Documentation Center (INSDOC), Defense Science Documentation Center (DECIDOC), National Social Science Documentation Center (NASSDOC), National Information System for Science & Technology (NISSAT), etc. these centers provide new research and technical development information in different countries.

In this way, the use of libraries in the business and industry sectors is increasing day by day. That mainly focuses on various functions like:

- Information related functions
- Decision-related functions
- Education-related functions etc.

Thus, In India, the library and information centers play a special role in economic development.

Status of the library profession in emerging perspectives

The success or failure of the library environment depends on where the library is located. If the library is located in the center of its service area, it can reach people very easily, and also the resources of the library can be used and developed in appropriate proportions. In this regard, in ancient and medieval times when libraries were in traditional forms, they needed to be spread to the state, city, district, rural areas and significant efforts were made. While in modern times the expansion of the geographical area, information explosion, duplication in information, variety in the community, and the awareness of the user class, crises of financial resources, and crises in time management are

hurdles for the library. As a result, in modern times, it is necessary to consider certain things to expand the scope and service of the library, like,

- To convey every piece of information to more and more readers
- To properly develop the various organs of library activity
- To take special advantage of the services of experts
- To make the best use of time, energy, money, and space
- To make library services effective
- To provide special service in a specific subject
- To properly develop the goal of the individual library
- To satisfy the increasing demand of the user, etc.

The above matter requires foresight and proper policy planning which we will now discuss.

Emerging technologies and sustainable librarianship

Due to the development of S&T, technology is being used in every field today. The role of technology in the library profession is also significant which can be clearly understood from the following.

In the "Mann Ki Baat" program on November 29, 2020, Prime Minister Shri Narendra Modiji said that today many museums and libraries in the country are working to make their collections fully digital. Our National Museum New Delhi has made some commendable efforts in this regard. The National Museum is in the process of launching about ten virtual galleries - it's a pleasure! Now one can visit the galleries of the National Museums of Delhi from the comforts of home, where on the one hand the cultural heritage is to reach more and more people mainly through technology and on the other hand, the use of technology is also important for the preservation of this legacy.

Thus, it can be said that the IT environment is indispensable for libraries in today's society but it is not appropriate to use IT tools in a library environment without comparing traditional libraries and modern IT environment-based libraries. The points of difference between the two are clarified here:

The components of the IT environment library include,

- Electronic Collections
- E-storage, Blue-Rays, DVDs, CDs, Floppies, TVs VCRs, Telephones…
- Computer Systems with Multimedia
- Network and Internet
- Hardware Devices
- Scanners, digitizers…
- Software Devices
- Open Sources, Browsers, Image Editing…

- Electronic Materials
- E-Books, E-Journals, E-Documents…
- Electronic Communication Systems
- E-Mail, Chat, WhatsApp…

The following effect can be made in the library due to the above technology.

Information Activity	Conventional Method	IT Environment structure
Generate Originate	Writing Typing	Word Processing Text Editing Character Recognition Voice Recognition
Preserve Store	Manuscript Paper Print Media	E-Publishing Magnetic Storage Computer Disk Teletext and Videotext
Process	Classification Cataloguing Indexing	Electronic Data Processing Artificial Intelligence
Retrieval	Catalogue Indexes	Data Management system (DBMS) Online and Offline
Disseminate Communicate	Hardcopies Lists Abstracts Bibliographies	E-Mail Electronic Document Delivery Computer Conferencing
Destroy	Physical Weeding	Optical Erasers Reuse the Medium

Thus, it is clear from the above comparative discussion that it is necessary to place emerging technology in the library profession. Many committees and commissions were formed by the Government of India and the UGC to accelerate the library profession. The recommendations of these committees and commissions also emphasized the use of emerging technologies and the modernization of the library. The names of the notable committees and commissions are as follows.

1. Advisory Committee for Libraries (1957)
2. Library Committee (1957)
3. Review Committee on Library Science Education (1965)
4. National Policy on Library and Information System (1986)
5. Curriculum Development Committees (1990 & 2001):
6. National Knowledge Commission (2005)
7. National Mission on Libraries (2012)

Thus, it can be said that the traditional library is the primary requirement of society, it is true but it is not a complete form. So, the concept of modern libraries is welcome and it is thanks to IT. Because of the IT environment,

The library goes to the user. The user does not have to come to the library.

Electronic, microelectronic, and telecommunication tools are used in the search for information, not human labor.

Information can be used by many people at once and at the same time, which is the limitation of a traditional library.

Information is always present which means that there is no question of reservation of information.

It becomes possible to use new and different forms of information.

Current emerging technology trends in libraries

Users of libraries are just like almighty and it is very important to know how to provide library services to them as well as what technology can be used to improve these services. The following advanced and digital facilities are very useful for the library environment.

- Digital maker labs
- Coding clubs
- Digital storytelling
- Virtual reality
- Mobile apps
- Open Libraries
- RFID technologies
- Cloud printing, copying, and scanning
- Robots
- Kinetic bikes in the library
- Single sign on to resources
- Streaming services

The key features mentioned above are just a glimpse of some of the fantastic digital projects around the world that help users connect with libraries as libraries have always shared knowledge, culture, and skills and in the modern period this is the way which has to be adopted.

Contribution of library and information science education to library professional activity

Library and information science subject education also contributes significantly to the professional activities of the library as only if the library professionals are educated will they be able to become aware of the emerging trends and also implement them in the library functions. Library business growth can also be estimated by incorporating recent emerging trends in LIS

education. The following points about recent emerging trends in LIS education are worth considering.

The Teaching of Traditional Techniques:

- Less emphasis on the teaching of traditional subjects like classification and cataloguing is given by the LIS schools. Their form of teaching is also getting change. These days there is more emphasis on the teaching of library software and ICT (Information and Communication Technology).

Five Year Integrated Course:

- An integrated course in library and information science is provided by three universities after senior secondary in India:
- Annamalai University, Calcutta University, and Guru Ghasidas Viswavidyala.

CBCS Curricula:

- Many universities in our country have presently formulated curricula based on the CBCS pattern, and others are in the process of it.

MOOCs:

- There is an emergence of different MOOCs (Massive Open Online Courses) in the LIS education which are available on library and information science on the SWAYAM platform in India.

Online Refresher Course in Library and Information Science:

- Now, Online Refresher Course in Library and Information Science is made available on the SWAYAM platform under ARPIT (Annual Refresher Program in Teaching) for the faculty of LIS discipline and LIS professionals. This course is valid under CAS (Career Advancement Scheme).

Conferences & Seminars:

- There is an increase in the number of conferences and seminars organized on various themes in the library and information science profession.

So, there is no doubt that the modern library environment i.e. IT-based library structure can be set up, that is the demand of the time also and more and more user demand can be met with savings of time, energy, and money, as well as the library profession, can be developed to a Popular organization. In this reference, the library fulfills the following characteristics

1. It does not have any personal library, but many libraries are attached to it.
2. There is a complete and organized data collection, which can be accessed through the online system.

3. There is digital and non-digital literature is available. Most likely it is found in E – Documents item.
4. It is a digitalization structure; the process of diversified permanent data collection and its sharing becomes easy.
5. It is possible to provide various library services effectively and it has also a user-friendly environment.

Where the emergence of new information, its collection, evaluation in old information as well as it can be made available immediately. The country's border does not interfere in the exchange of information.

Thus, it is clear that it is very systematic and easy to gather, store, process, and disseminate information in IT libraries. The user's needs are met by creating additional technology such as reprographic technology, technical communication technology, and database.

There is no doubt that the library profession is a high-class profession and must change over time. So, in the modern digital environment, the library must also move from the traditional method to the digital environment. However, there are also undesirable disadvantages. It needs to be looked at and taken care of.

- It wants very big financial funding.
- It requires an experienced employee.
- Political policies become a barrier.
- The lack of expertise in library science is seen.
- There is a lack of National Information Policy.

Besides, Indian library education is also responsible. The following are the challenges for Indian library education that hinder the development of a modern library environment.

Variety in the nomenclature of LIS Schools

- LIS schools have been given different names. The nomenclature is not uniform.

Affiliation to Faculty of LIS Schools:

- There is a lot of variation found in affiliation to the faculties. Most of the LIS departments are affiliated with the faculty of arts and some under the faculty of Social Sciences.

Accreditation:

- In LIS education no such apex regulatory body is there in the country whereas for other courses such as Law (Bar council), Medical courses (Medical council), Technical education (All India Council for Technical Education), and Education (National Council for Teacher Education) are there. In the UK, all LIS schools are accredited by CILIP (Chartered Institute of Library and Information Professionals).

Mushrooming growth of LIS Education and mismatch between the demand and supply:

- When our country got independence, at that time only five universities were offering library science courses but today 155 universities are offering different courses. There is no check and balance in the emergence of LIS schools.

Inadequate Faculty Strength and non-uniformity in the pay structure:

- There are no proper teacher-student ratios in the LIS schools. Moreover, in self-financing or private institutions, no proper permanent faculty is there. They are just commercial ventures. There is also disparity found in the scales and retirement age of the teachers.

Lack of Infrastructure Facilities:

- In many LIS schools, there is a lack of well-equipped IT labs. According to UGC, CDCs, there should be proper computer facilities along with library software should be available to the students. Proper library facilities having reference books, a list of subject headings, classification schemes, cataloguing codes are not available in many LIS schools.

Curriculum Revision:

- Many universities are following old LIS syllabi. They are not updated accordingly to the undergoing changes in society. There is a huge disparity in the LIS curriculum of the universities. Presently, only a few universities have taken their own initiative to implement the CBCS curriculum for the LIS courses.

Selection Criteria and Intake of the Students:

- Library and Information Science is not a popular course among the students. Though LIS education is more than 100 years old in our country, yet the students come into this profession just by chance, not by choice. Due to less popularity, this profession is unable to get the best brains.

Conclusion

In ancient times, the right to acquire knowledge and study reading material was limited to a few members of society. Resources were handwritten at this time as well as a lot of attention was paid to the preservation of resources in libraries so that they were rare for the common people.

Now both time and situation have changed, due to the invention and development of paper and printing press, there has been a revolution in the field of production of reading materials. There has also been a change in the approach to library service. In addition, it is important to keep in mind that advances in technology have facilitated communications and

telecommunications that suggest moving to a digital library, a virtual library, a library without a wall, and a paperless library, not within four walls. This form also plays an important role in social, economic, and cultural development, which is why every library has to move forward using emerging technology. However, it requires a basic library facility, adequate reading collection, various forms of reading material and its use, educated, expert and trained staff, as well as the convenience of modern technology and collaboration of library users.

It can be said that the traditional library is a basic need of the society, it is true but it is not a complete form. The new century seeks progress, change, and independence from the traditional method so the concept of modern libraries is welcome and it is thanks to IT. One more thing is that the LIS profession has undergone metamorphosis due to technological changes. To go along with the changes, LIS education needs to be revamped. All LIS departments and professional associations across the country should come together to bring uniform standardization in LIS education according to the present needs.

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Anxiety of Libraries Professionals Working in Private Sectors due to Covid -19

Nishant Madhukar

Abstract

Covid-19 pandemic has become the biggest disaster the current generation has ever seen majority of the people around the world are directly or indirectly suffering losses of various kinds from this pandemic. There are arguments on the sources of the new corona virus and how it can be cussrbed. But no solution has yet been found by any of the countries. People have been required to isolate themselves from the rest of the world for many months now. This has led to an unimaginable sudden increase in slowing down. The present study aims to Understand the different stresses and anxieties that libraries professionals working in private sector in western U.P & Uttaranchal (Saharanpur, Roorrke, Dehradhun). The study was conducted from January 2021 to April 2021. One way ANOVA and Chi Square Test are used to Analyses the data. The Finding show That Major share of workforces is suffering from anxiety. The private sector libraries Organization must come up with new ideas to reduce anxiety amongst there libraries professionals working with them.

Keywords: *job Stress, Financial Stress, Physical/Health Stress, Recognition Stress, Covid-19 Pandemic, Private sector*

Introduction

The Year 2020 started with new corona virus slowly spreading across the world. By January end the virus spreading took a fast pace started wildly spreading. The Virus is still not under control and it has been dramatically affecting the lives of millions of people all over the world. There present study derives importance in the fact that Libraries professionals working in

private sectors are currently going through a drastic change in their social and work life. Studies show that anxiety has been significantly increasing in many Libraries professionals working in private sectors. Covid-19 has the Potential of escalating this further.

Literature Review

Review of literature acts as a Backbone of any kind of study, thus it play a vital role in furtherance of research. In the context Patte in her article titled" The Difference Between worry, Stress and Anxiety" Talk about how worry. Stress and anxiety from Each other. The paper exam plain how each of These Mental health issues takes places and the thing that will help to control these. (pattee,2020)

Nader salari, Amin Hosseinian – Far, et.al. In their Paper titled 'prevalence of stress, anxiety' depression among the general population during the Covid -19 pandemic: a systematic review and meta-analysis' attempt to analyze the existing research works findings that are related to the prevalence of stress, anxiety and depression in the general population during the Covid-19 pandemic. The study shows that the prevalence of stress, anxiety, and depression, as a result of the pandemic in general population, are 29.6, 31.9 and 33.7% respectively. (Salary, et al., 2020)

Kamaldeep Bhui. Sokraitis Dinos. Et. Al., have made a research paper on perceptions of work stress cause and effective interventions in employees working in public, private and non-governmental organizations. The study collected data through interviews of 51 employees from different organizations. The result shows that the major causes of stress in employees are unrealistic demands of management. Lack of appreciation, poor communication, etc. The paper details how organizational and personal interventions outside the work can help in effectively reducing stress in employees. (Bhui, Dinos, Miecznikowska. Jongh, & Stansfed, 2016)

Patricia in an article titled 'The Impact of Financial stress on your employees' explain the financial stress exist in many people- Old, Young, Male and Female. The Presence study of financial stress in Libraries professionals working in private sectors. Covid-1 can lead to interpersonal conflicts, high risk behaviors (substance Mental, Financial & health disorder, etc.) accidents due to fatigue and deteriorating health of employee. It may also cause reduced productivity. (Bonner, 2016)

Objectives

The objectives of the study are:

1. To study the various kind of anxiety that the libraries professionals working in private a sector have been experiencing.

2. To find out the level of overall anxiety of the libraries professionals working in private sector.
3. To understand whether the efforts of libraries professionals working in private have helped the better management of their stress and anxiety.

Methodology

1. Scope of study: The present study tries to understand anxiety amongst Libraries professionals working in private sector western U.P & western Uttaranchal (Muzafarnagar, Meerut, Saharanpur, Roorrke, Dehradhun).
2. Data Collection: primary data relating to the study is collected through a structured question from a sample of 200 respondents between 1st January and 10th February2021. The sample is formed through convenience sampling technique.
3. Sample: of the 200 respondents, 101 are male ad 99 are female 66 respondent are below 25 years of age, 65 respondents belong to 25-30 age category 29 to 30-35 age category 20 respondent each to 35- 40 and above 40 age categories. As per the current family situation, 100 of the total respondents are single, 13 are single parent, 56 are married with kids and 31 are married with no kids. According to income level of the respondents, 21 belong to below Rs 1.50,000category, 34 to Rs 150,000-2,00000 categories, 59 to above Rs 2,00000-Rs 2.50,000 Category, 34 above to Rs 2.50,000- Rs 3,50,000 and 52 to more than Rs 3,50,000 category.
4. Data Analysis: The hypotheses are tested using One-Way ANOVA and Chi Square test. The Study also uses pie chart & Bar chart for analysis l

Theoretical Framework

Worry, Stress and Anxiety

Worry is a psychological response to negative thought and uncertain outcome. It relates to a Person's mind rather than his/her body. It is a cognitive phenomenon meaning it is created through one's thoughts and cognitive phenomenon meaning it is created through one's thoughts and perceptions. It is Unpleasant thought thoughts that make a person felt unwell. Worry is not always negative. Some level of worry is important to human beings to help them well prepared. However, in today's world we see people worrying over meager thing excessively leaving them physically and mentally exhausted.

Them physically and defined as the natural physiological responses to threats. Stress enters a person when there actually exists something in the

environment of that person which has the potential of hurting him or her. There can more than one threat that may disturb the peace of individuals. Stress involves understanding the situation that the person himself is undergoing and the possible repercussions and challenge that the situation offers. Stress also involves the body responding to the pressure of threats. It may be different for each person as to how their bodies respond to the threats in their Environment. It could be in the forms of clammy palms, headache, body pain, etc.

Anxiety is expressed in the same way as worry and stress. It affects both body and mind. It is similar to stress except that there are no real threats in the environment of the person. Anxiety also means worrying over negative thoughts. People become anxiety also mean worrying over negative thoughts. People become anxious even though there are no visible threats in the Environment because of factors like lack of confidence, past experiences, lack of clarity about future, etc. Future is always uncertain. But when People are not able to understand them at least to some extent, they become anxious.

Libraries professionals working in private can be anxious about a variety of things. The present study focuses on four types of anxiety identified in Libraries professionals working in private. They are job anxiety, Health anxiety, financial anxiety and Recognition anxiety.

1. Job anxiety: This is the type of anxiety that Libraries professionals working in private sector feel when they are unsure of their job security. Libraries professionals working in private sector become anxious about their job when there are chances of them being laid off. Job anxiety is considered in this study as the current situation of Covid -19 has the potential of reducing the job opportunities and taking away the existing jobs. The Indian economy had already not been doing away the existing jobs. The Indian economy had already not been doing well. Then lockdown imposed as corona virus started spreading which has led the economy in to an even deeper pit and recovery seems blur.
2. Health anxiety: This is the type of anxiety that people have when there are chances of losing their health. Good health is Important to be productive. Libraries professionals working in private sector may become anxious about their health as it would affect their productivity and their health as it would affect their productivity and their path to be happy. Though the death rate is not high, it cannot be ignored that many people have lost their lives to Covid-19. The virus is especially dangerous to the elderly, children and sick people. In this time of pandemic, health anxiety gains almost importance to be studied.
3. Financial Anxiety: The anxiety of not being able to earn more or losing money is called financial anxiety. People need money to live

comfortably. In the current Covid-19 scenario there are reducing or cutting off the salary of Libraries professionals working in private sector as a result of Covid-19, many private educational Organizations are not performing well and the profitability has reduced. Libraries professionals working in private sector may anxious have reduced or no salary and financial anxiety is considered for study.

4. Recognition anxiety: It is the anxiety of not being appreciated or recognized by the private education organizations for the services rendered by the libraries professionals working in private sector. Recognition is important to Libraries professionals in addition to salary and other finical compensations. Covid-19 has placed Libraries professionals at their homes and there are no direct supervisions and communications. There are chances of Libraries professionals being anxious about not being recognized for their contribution to working their private education organizations

Hypotheses

The following are hypotheses developed for study.

1. There is no significant variation in presence of job anxiety in the employees according to age, gender, current family status or income level
2. There is no significant variation in presence of health anxiety in anxiety in the employees according to age, gender, current family status or income level.
3. There is no significant variation in the presence financial anxiety in the employees according to age, gender, current family status or income level
4. There is no significant variation in presence of recognition anxiety in employees according to age, gender, current family status or income level.
5. There is no significant impact of employer's efforts on the level of anxiety of employees.

Findings

The following are the finding of the study from percentage analysis and hypotheses testing:

- 115 individuals job anxiety whereas 85 sample units do not have anxiety about their job stability or growth. The above graph show that more than half of the sample unit have anxiety regarding their job.

Question	Responses	Respondent	Percentage
Job anxiety	Yes	115	63.53
Job anxiety	No	85	43

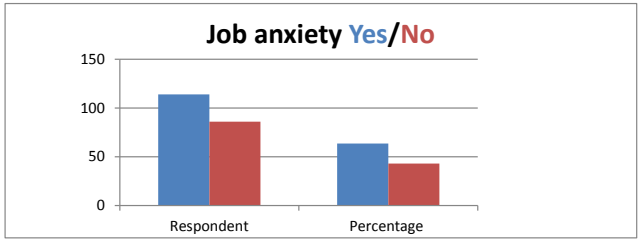

Figure 1: Distribution of respondents based on whether they have job anxiety

- 114 sample units have anxiety regarding them during this time period of Covid pandemic.86 individuals do not have health anxiety

Question	Responses'	Respondent	Percentage
Health anxiety	Yes	114	63.53
Health anxiety	No	86	43

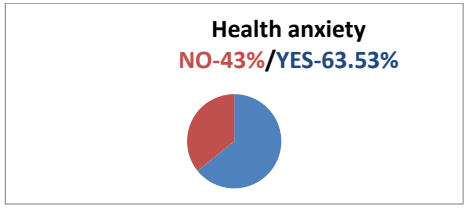

Figure 2: Distribution of respondent based on whether they have health anxiety

- 120 Individuals have Anxiety Regarding their Financial Stability and growth Whereas 80 units in the sample are not anxious about their finance.

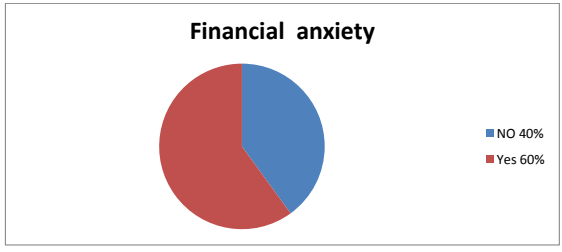

Figure 3: Distribution of respondent based on whether they have financial anxiety.

- 121 sample unit have admitted that they have anxiety of not being recognized or appreciated by their employers for the work they do 79 sample units do not have recognition anxiety.

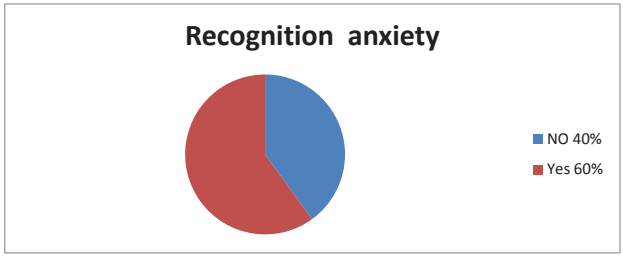

Figure 4: Distribution of respondent based on whether they have recognition anxiety

- Most of the people have anxiety level of 3 on a scale of 5 which means that they have medium level of anxiety.

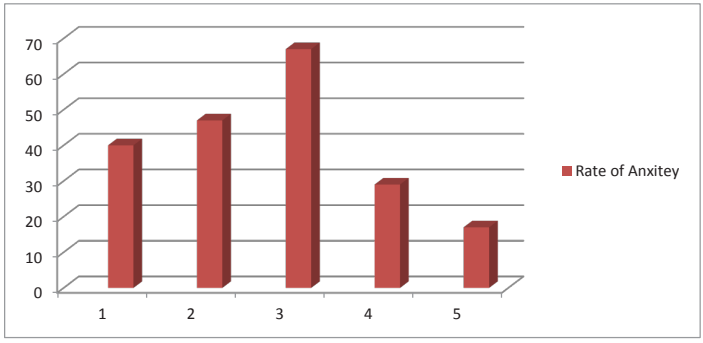

Figure 5: Distribution of respondents based on the rate of overall anxiety out of 5.

Hypotheses Testing

First Hypothesis testing

Ho: There is no significant variation in the presence of job anxiety in the Library Professional according to age, gender, current Family status or income level.

Hypothesis	**p-value**	**Interpretation**
There is no significant Variation in the presence of job anxiety in the library professional according	- 0.009 -	There is significant variation in the presence of job anxiety in the Library professional according to

to age. to age.

There is no significant variation in the -0.405 - There is significant variation in the

The presences of job anxiety in the presence of job anxiety in the library

Library professional According to gender professional According to gender

There is no significant variation in the -0.195- There is no significant variation in the presence of job anxiety in the library presence of job anxiety in the library

Professional according to current family Professional according to current family

Status status

There is no significant variation in the presence -0.852 - There is no significant variation in the

Of job anxiety in the employees according *to* presence of job anxiety in the library

Income level Library professional according to income level

To show that there is high level of significant variation as the p-value is less than 0.01

The One-way ANOVA test result show that age has significant influences on the presences of job anxiety amongst the employees.

Second Hypothesis Testing

H0: There is no significant variation in the presence of health anxiety in the Library Professional according to age, gender, current family status or income level.

Hypothesis	**p-value**	**Interpretation**
There is no significant	- 0.705 -	There is significant variation in the
Variation in the presence of health		presence of health anxiety in the
anxiety in the library professional according		Library professional according to
to age.		to age.
There is no significant variation in the	-0.113 -	There

is significant variation in the

the presences of health anxiety in the presence of job anxiety in the Library Library professional According to gender professional According to gender

There is no significant variation in the -0.628- There is no significant variation in the presence of health anxiety in the Library presence of health anxiety in the Library

Professional according to current family Professional according to current family

Status status

There is no significant variation in the presence -0.038 - There is no significant variation in the

Of health anxiety in the employees according *to* presence of health anxiety in the library

Income level professional according to income level.

The One-way Anova Test result show that level of income of employees have significant influence on the presences of health anxiety amongst them.

Third Hypothesis Testing

H0: There is no significant variation in the presence of financial anxiety in the employees according to age, gender, current family status or income level.

Hypothesis	**p-value**	**Interpretation**
There is no significant	- 0.705 -	There is significant variation in the
Variation in the presence of health		presence of health anxiety in the
anxiety in the library professional according		Library professional according to
to age.		to age.
There is no significant variation in the	-0.113 -	There is significant variation in the
the presences of health anxiety in the		presence of job anxiety in the Library Library professional According to gender professional According to gender
There is no significant variation in the	-0.628-	There is no significant variation in the presence of health anxiety in the Library presence of health anxiety in the Library

Professional according to current family Professional according to current family

Status status

There is no significant variation in the presence -0.038 - There is no significant variation in the

Of health anxiety in the employees according *to* presence of health anxiety in the library

Income level professional according to income level.

To show that there is high level of significant variation as the p-value is less than 0.01

The above hypothesis testing show that age has a very significant influence on the presence of finical anxiety amongst the library professional. Income levels of library professional also have significant influences on financial anxiety working in private sector.

Fourth Hypothesis Testing

H0: There is no significant variation in the presence of recognition anxiety in the employees according to age gender, current family status or income level.

Hypothesis	**p-value**	**Interpretation**
There is no significant Variation in the presence of recognition anxiety in the library professional according to age.	- 0.016 -	There is significant variation in the presence of recognition anxiety in the Library professional according to age.
There is no significant variation in the presences of recognition anxiety in the Library professional According to gender	-0.751 -	There is significant variation in the presence o recognition f anxiety in the Library professional According to gender
There is no significant variation in the presence of recognition anxiety in the Library professional according to current family status	-0.016-	There is no significant variation in the presence of recognition anxiety in the Library Professional according to current family status

Status			There is
no significant variation in the presence	-0.153	-	There is no significant variation in the
Of recognition anxiety in the library professional			presence of recognition anxiety in the library
according to *Income* level			professional according to income level.

The fourth hypothesis testing show that age current family status of library professional working in private sector have significant impact on recognition anxiety in them.

Fifth Hypothesis Testing

H0: There is no significant impact of employer's effort on the level of anxiety of the employees.

The Chi Square test shows that the p-value is 0.061(greater than the level of significance of 0.005). Hence, the null hypothesis is accepted. It means that the Private educational Organizations' efforts do not have a significant impact on the level of anxiety among the library professional working their libraries.

Suggestion

The Graph show that around majority of the library professional working in private sectors have anxieties relating their job, health, finance and recognition. There must be some measure to reduce anxiety amongst the library professional working in private sectors. However, the fifth hypothesis test result show that the Private educational Organizations' efforts do not have much significant influence on the level of anxiety of the library professional working in private sectors. This means that the Private educational Organizations' must come up with innovative ways to help their library workers in dealing with anxiety. Since and meaningful conversations and programmers can be conducted via digital platforms. This can boost library professional working in private sectors morale in this difficult time of covid-19. The Private educational Organizations' must conduct survey and talk to understand what their library professional working in their libraries belongs to private educational sectors truly wants from their employers during this pandemic.

Conclusion

The study aims to understand the kind of anxiety that the library professional working in private sectors is going through during the covid-19 pandemic. The study Cleary shows that there is a serious need to address anxieties of library professional working in private sectors related to job,

health, Finance and recognition as nearly 60% of the sample units have each of these anxieties respectively. Various literatures show that anxieties among many technical field's professionals have an adverse impact may be health deterioration, unhappiness, inability to communicate, etc. But all these outcomes indirectly affect the company productivity at large in the long run. The Private educational Organizations' must give utmost important to their library professional working in their library's anxiety especially in the context of covid-19 pandemic when uncertainty is at the highest.

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Information Literacy Skills - A Comparison of Two Undergraduate Cohorts with and Without Instruction

Vathsala Wickramasinghe & Thushari M. Seneviratne

Abstract

Since information literacy instruction is aimed at enhancing information literacy skills, the academic community needs to understand the outcomes of the instructional programmes to adjust instructional services to better suit undergraduate needs across disciplines. This paper provides the results of a study that compared two engineering undergraduate cohorts in Sri Lanka- one just commenced university education, who are in their first year, and the other who completed their first year and just entered the second year. The latter cohort had undergone academic instruction in their first year. The specific objectives of the study were to investigate 1) IL skills possessed by undergraduates belonging to these two cohorts, 2) whether IL skills vary between the two cohorts, and 3) whether individual and family characteristics influence IL skills. The survey of a total of 568 engineering undergraduate responses found that some differences between the two groups in information skills and information behaviour, and also found individual and family characteristics that influence information literacy. Overall, our study contributed to the existing literature in several aspects and has implications for the current practices.

Keywords: *First-year; Information literacy; information literacy instruction; undergraduate*

Introduction

Information literacy (IL) is important for undergraduates to acquire sustainable skills in learning. Achieving information literacy as a generic skill

is specified as one of the graduate attributes of undergraduate education. Information literate undergraduates possess "capabilities to master information content and extend their investigations, become more self-directed, and assume greater control over their learning across all disciplines, learning environments, and levels of education" (Pinto & Sales, 2007, p. 535). The lack of IL skills limits academic achievement due to difficulties encountered in effective and efficient ways of identifying information needs, retrieving, evaluating, and applying relevant information (Lwehabura, 2016). The provision of instruction for undergraduates to develop IL skills, and the assessment of the level of attainment are therefore essential at both academic discipline and institution levels (Feekery et al., 2021; Hicks, 2020) The assessment allows universities to understand whether IL instruction supported undergraduates to learn and policies adopted are effective in enhancing IL skills.

The literature on information literacy showed that undergraduates commence university education with limited IL skills (Gabridge et al., 2008; Lwehabura, 2016; Price et al., 2011). This has resulted in first-year students being the focus of much IL instruction at universities. The design and development of an appropriate IL instructional programme and the evaluation of its effect on undergraduates present many challenges. Although much of the literature suggests that undergraduates who had undergone academic instruction on IL perform better than those who had not (Malliari & Christodoulou, 2009; Petermanec & Šebjan, 2017), the available limited empirical support is insufficient for understanding outcomes of IL instruction and informed decision making to better cater to undergraduates' needs across disciplines.

This paper presents the results of an investigation conducted on two engineering undergraduate cohorts in Sri Lanka. One cohort is undergraduates who just commenced university education and in their first year, identified as the *first-year cohort*. The other is undergraduates who completed their first year and just entered the second year, identified as the *second-year cohort*. This cohort had undergone academic instruction in their first year. Therefore, it is of interest to understand whether the second-year cohort possesses more IL skills compared to the first-year cohort. The specific objectives of the study were to investigate 1) IL skills possessed by undergraduates belonging to these two cohorts, 2) whether IL skills vary between the two cohorts, and 3) whether individual and family characteristics influence IL skills.

Our study contributes to the literature and practice in several ways. First, there is a growing concern for universities to produce graduates who are information literate, which is a requirement of lifelong learning. Universities should understand the extent to which entry-level university undergraduates are information literate to better cater to their needs. Therefore, we did an investigation of 568 engineering undergraduates of a Sri Lankan university to achieve the above-mentioned objectives. Information literacy is a vital generic

skill for all undergraduates across all countries and disciplines. However, studies conducted on undergraduates in Asian developing countries are rare to be found. Further, the literature repeatedly identifies the importance of understanding IL skills across study disciplines. Like all other disciplines, IL skills are important for engineering undergraduates to complete their course assignments, research projects, and written work successfully. Previous studies emphasise the need of conducting discipline-specific studies and assessing IL skills at the level of the discipline (Catts, 2005; Clark & Catts, 2007; Folk, 2014; Price et al., 2011). In this regard, it is rare to find studies conducted on IL skills of undergraduates in the engineering discipline. Therefore, the findings presented in this paper are of value. Second, we compared two cohorts, those who had not undergone IL academic instruction and those who had undergone academic instruction. In this regard, it is important to know the needs of the students to serve them better and stated that failure to incorporate the needs of the undergraduates may lead to inappropriate pedagogic strategies. Our findings provide valuable information, such as whether IL instruction contributed to improving IL skills, whether the level of IL skills differs between the two cohorts, and what are IL components that each cohort identified as the most difficult. We believe this nature of information in the IL literature is rare and our findings are valuable for academics and practitioners alike for informed decision-making. Third, we included individual and socio-demographic characteristics to understand whether these influence IL skills. In this regard, previous studies such as Whitmire (2001) stated the importance of considering gender as a factor in IL skills, and Catts and Lau (2008) emphasised the importance of considering family patterns among other social factors as predictors of IL skills. In addition to the gender of the undergraduate, we included several variables, such as the role of mother, i.e., housewife or in paid employment, having siblings, and having grandparents or any other relatives living with family. We identify these can demonstrate certain Asian cultural patterns and may add value to our study.

Literature Review

Information literacy

Information literacy is identified as "a set of abilities requiring individuals to recognize when information is needed and to locate, evaluate, and use effectively the needed information" (American Library Association, 1989, p. 3). Therefore, IL is a wider concept that encompasses abilities to identify, locate, evaluate, organize and effectively use, create and communicate information (Clark & Catts, 2007; UNESCO, 2003). At the institution/university level, any attempt to bridge the gaps in IL skills to suit the requirements of the undergraduate programme emphasises the need for academic instruction to suit the discipline-specific learning, teaching, and research context of higher

education. The literature identifies five types of elements/components of IL for undergraduates in higher education. These five components of IL are recognising information needs, locating and evaluating the information, managing information, applying the information to create and communicate knowledge, and making appropriate and ethical use of information (Catts & Lau, 2008). Further, information literacy skills are recognised to develop in conjunction with information and communication technology skills since electronic databases and digital technologies are the prime sources of information today. Therefore, at the universities, the emphasis is on undergraduate acquiring, developing, and demonstrating IL skills to support academic achievements and independent lifelong learning.

First-year undergraduates' possession of IL skills when entering university

The literature suggests the prevalence of significant gaps in IL skills when students make the transition from secondary education to tertiary education (Gross & Latham, 2012; Lwehabura, 2016; Petermanec & Šebjan 2017). For example, Petermanec and Šebjan (2017) showed that students lack appropriate skills to express information needs, evaluate information and use information ethically. As a result, undergraduates in both developed and developing countries are found to commence their university education with limited IL skills when compared to the appropriate levels for university education (Gabridge et al., 2008; Lwehabura, 2016; Price et al., 2011; Thompson & Blankinship, 2015). Due to insufficient levels of IL skills, entry-level undergraduates face challenges in search, retrieval, and use of information, having implications for their academic achievements and the efficient use of resources offered by universities. For example, previous research showed that undergraduates lack appropriate IL skills for the understanding of what constitutes quality scholarly information (Rowlands, 2008), evaluating internet information (Ali et al., 2010), identifying efficient search strategies (Ali et al., 2010), applying sophisticated information searching strategies (Rowlands, 2008), evaluating the information retrieved (Rowlands, 2008), and using information ethically (Ali et al., 2010). This suggests the importance of assessing IL skill levels of first-year undergraduates as the first step followed by academic instruction to bridge the gap.

Instructions on IL for undergraduates during university education

Since the recognition of IL as a graduate attribute, universities are expected to measure and report IL skills in the first year of study and expected to demonstrate improvements of these skills in undergraduates. This urges the libraries to take steps to enhance IL skills through planned instruction (Hicks, 2020; Marcum 2002). The literature also provides evidence that such programmes are being constantly developed and delivered (e.g. Clark & Catts, 2007; Dandar & Lacey, 2021; Feekery, et al., 2021; Petermanec & Šebjan, 2017). Further, the evidence suggests that the first-year students are the subject of

much IL instruction at universities (Seamans, 2002). The instruction on IL can be either stand-alone sessions or within the undergraduate programme run by the library (Bedford, 2021; Clark & Catts, 2007; Seamans, 2002; Usova & Laws, 2021). Information literacy instruction delivered within the undergraduate programme demands librarians to work closely with faculty to ensure that the needed skills are included in the instruction (Clark & Catts, 2007) and deliver within the formal framework of the undergraduate programme (Lloyd, 2005). In this regard, Lloyd and Williamson (2008), state "in the education setting, where the focus is on instruction, IL is closely aligned to skills and attributes. In the same settings where IL is viewed as connecting with content, IL is viewed as learning" (p. 8).

The literature provides evidence for improvements in IL skills in undergraduate students after formal IL instruction (Malliari & Christodoulou, 2009; Petermanec & Šebjan, 2017; Tarrant et al., 2008). For example, Malliari and Christodoulou (2009) and Petermanec and Šebjan (2017) showed differences in IL skills between those who attended the programme and those who have not, where those who attended demonstrating higher levels of IL skills. Tarrant et al. (2008) showed differences in IL skills in undergraduates before and after IL instruction. These studies provided evidence that undergraduates showing more proficiency in accessing and searching electronic databases (Tarrant et al., 2008), using referencing formats (Tarrant et al., 2008), demonstrated more confidence in using IL skills, and using bibliographic databases and journal literature (Chu et al., 2011; Jacobs et al., 2003). However, Brown and Krumhol (2002) reported that students failed to demonstrate significant improvements to present, discuss and critique information even after undergoing IL instruction. Building on the above-reviewed literature, it is hypothesised:

H1: There are significant differences in IL skills between undergraduate those who attended IL instruction and those who have not, where those who attended demonstrate higher levels of IL skills.

Individual and family-related predictors of IL skills

Our review of the literature led to reveal, on the one hand, that investigating the influence of individual characteristics on IL is not much popular. On the other hand, IL research is not much popular in the non-Western context. However, some previous studies emphasised the importance of taking into account individual characteristics in IL research (such as Catts & Lau, 2008; Whitmire, 2001). Although Whitmire (2001) investigated the gender differences in influencing students' satisfaction with IL skills, failed to found significant differences. Therefore, we investigated six individual and family characteristics in the study. The individual characteristics were age, sex, the existence of siblings, and Z Score achieved in the university entrance examination. Catts and Lau (2008) state "information and the skills to use it are needed in every society, but the ways that a citizen may identify and express

information needs are affected by family patterns, language, and religion, among other social factors" (p.24). Building on these arguments, we included two family-related characteristics. These were whether respondents had grandparents or any other relatives who live with them during their school days who influenced them, and the role of mother, i.e., in a paid employment or housewife. Therefore, it is proposed:

H2: Individual and family characteristics significantly predict IL skills.

Method

Population and sample

The survey was conducted in one of the state universities in Sri Lanka. A random sample of undergraduate students of the first year and second year from the four-year undergraduate degree programme participated. Table 1 provides data on population and sample. The first-year cohort was just entered the degree programme with three months of the university experience. Therefore, they were assumed to have general IL skills, and have not yet been exposed to information sources exclusive to the engineering discipline. The second-year cohort completed their first year and just entered the second year. Hence, they had some exposure to discipline-specific knowledge in their first year. Further, they were given academic instruction to enhance IL skills conducted by the university library in their first year. The details of this programme are given in the latter part of this paper. Therefore, the second-year cohort was assumed to have developed some level of IL skills useful for the university set-up. Both first-year and second-year cohorts voluntarily respond to the anonymous survey questionnaire in the classroom setting. The paper-based survey was administered to each group of students on only one occasion. The survey was distributed at the end of a class and requested respondents to leave the completed survey at a designated place in the classroom. The questionnaire took approximately 15 minutes to complete. The survey was in the English language, which is one of the national languages of the country, and the only language for academic instruction at the university. Further, all forms of resources provided by the university library for the degree programme are in the English language.

Table 1: Population and sample

	Population	Sample (responses received)	% represented
First-year cohort	706	409	58
Second-year cohort	731	159	22

Information literacy instruction experienced by second-year cohort

As part of the nine-week long orientation programme before academic engagement for 731 (then) first-year undergraduates, the library was

invited to deliver academic instruction to enhance IL skills. University's academic librarians worked closely with the faculty to design and develop the programme addressing needed skills for engineering undergraduates. Undergraduates were divided into 13 groups to ease academic instruction. Undergraduates in each group received two hours of academic instruction per week on IL through nine weeks as part of the formal academic orientation programme. Nine different topics were selected for each week; in each week, academic instruction is followed by hands-on sessions, discussion sessions, individual activities, group activities, and homework assignments.

Organization of the nine-week programme

During week one, documentary video shows were arranged with the theme learn beyond tradition. Topics of general interest such as global warming and professional conduct were shown. During week two, instructions were given on bibliographic data of books, and on identifying and locating books. During week three, instructions were given on periodicals. During week four, an introduction was given about the library. This included library's structure, layout, facilities, services, and procedures. During this session, undergraduates were shown a documentary video produced by the university library on its services followed by a video produced by the British Library on handling printed materials. Week five was devoted to providing instruction on online information sources and services. This also included an introduction to the university website and its OPAC system. In week six, instructions were provided on organizing information, and group tasks were given on creating mind maps. During week seven, students were more familiarized with OPAC, handling databases, data fields, and abbreviations. During week eight, instructions were provided on referencing and the ethical use of information. During the last week, students were introduced to leisure reading, and the programme ended with feedback and a question-and-answer session.

Measures

IL skills

We used two instruments to evaluate IL skills of undergraduates, where one instrument is called *information skills* (Clark & Catts, 2007) while the other is called *information behaviour* (Pinto & Sales, 2007). Both information skills and information behaviour scales sought responses in similar IL areas the two scales differ based on the purpose of measurement. Specifically, the measure of information skills sought responses for the perceived level of IL possession while the measure of information behaviour sought responses for the perceived level of general competence achieved. The details of the measures are as follows.

Information skills. The 20-item scale of Clark and Catts (2007) was used. The scale assessed IL in five areas, namely, skills to access needed information,

evaluate information and the information-seeking process, manage information, apply information, and use information ethically, legally, and respectfully. Items were on a Likert-type scale ranging from always (4), often (3), sometimes (2), and never (1). The scale used is given in Appendix 1.

Information behaviour. The 20-item information behaviour scale of Pinto and Sales (2007) was used. The scale inquires general competence/conceptions related to needs of, access to, processing of, and use of information. The scale assessed the degree of success achieved in organization and planning, capacity for analysis and synthesis, computer literacy, information management, and decision-making. Items were on a Likert-type scale ranging from very high (4), high (3), low (2), and very low (1). The scale used is given in Appendix 1.

Individual and family characteristics. We collected information on six characteristics. Data on age and number of siblings were collected on a ratio scale (years). Sex was coded as female (0) and male (1). We collected Z Score achieved by each respondent in the university entrance examination. We also inquired whether respondents had grandparents or any other relatives, who influenced them, living with them during school days (yes [1] or no [0]), and the role of mother, i.e., in a paid employment (1) or housewife (0). These characteristics of the respondents are shown in Table 2.

Table 2: Individual and socio-demographic characteristics

	First-year cohort	**Second-year cohort**
Z Score in university entrance examination:		
Mean	2.2	2.1
Std. Deviation	0.4	0.4
Age:		
Mean	20.92	21.90
Std. Deviation	1.24	0.76
Minimum	19	21
Maximum	21	23
Sex (%):		
Male	71.7	76.4
Female	28.3	23.6
Siblings:		
Mean	1.73	1.83
Std. Deviation	.87	1.10
Minimum	0	0
Maximum	4	5
Mode	1	1
During school days, grandparents or any other relatives lived with your family, who had an influence on you? (%):		

	First-year cohort	Second-year cohort
No	48.1	53.8
Yes	51.9	46.2
Mother's role (%):		
Housewife	55.4	51.0
In paid employment	44.6	49.0

Methods of Data Analysis

The measures were subjected to appropriate internal consistency reliability, factor structure, convergent validity, discriminant validity, and construct reliability. Principle component factor analysis with Varimax rotation was performed on the variables of information skills and information behaviour. As expected the factors yielded corresponded with Appendix 1. The independent sample t-test was used to understand the differences between the two cohorts. Regression analysis was used to identify how far information skills and information behaviour were influenced by individual and family characteristics.

Results

Table 3 shows the results of the first-year cohort and second-year cohort for information skills and information behaviour. The rank order based on mean scores is also shown in Table 3. The results suggest that irrespective of whether information skills and information behaviour first-year and second-year cohorts ranking order remain consistent. Although the second-year cohort, who had undergone formal instruction in IL obtained higher mean values for both information skills and information behaviour, the ranking order does not deviate from that of the first-year cohort.

Table 3: Comparison of IL

Information skills			**Information behaviour**		
First-year cohort	Second-year cohort			First-year cohort	Second-year cohort
Mean (Rank)	Mean (Rank)			Mean (Rank)	Mean (Rank)
2.73 (1)	3.01 (1)	Apply information	Decision-making	2.83 (1)	2.93 (1)
2.72 (2)	3.00 (2)	Access needed information	Computer literacy	2.77 (2)	2.91 (2)
2.65 (3)	2.84 (3)	Use information ethically, legally and respectfully	Organization and planning	2.68 (3)	2.78 (3)

Information skills			Information behaviour		
First-year cohort	Second-year cohort			First-year cohort	Second-year cohort
Mean (Rank)	Mean (Rank)			Mean (Rank)	Mean (Rank)
2.59 (4)	2.69 (4)	Evaluate information and information sources	Capacity for analysis and synthesis	2.66 (4)	2.77 (4)
2.16 (5)	2.26 (5)	Manage information	Information management	2.66 (5)	2.76 (4)

A comparison of information skills between first-year and second-year cohorts is shown in Table 4. Skills on accessing needed information, applying information, and using information ethically, legally, and respectfully have significant differences between the two cohorts. It is also evident that both groups scored the highest for the application of information.

Table 4: Information skills

	Second-year cohort		First-year cohort		t
	Mean	**SD**	**Mean**	**SD**	
Access needed information	3.00	.58	2.72	.59	4.80***
Evaluate information and information sources	2.69	.52	2.59	.57	1.88
Manage information	2.26	.54	2.16	.48	1.96
Apply information	3.01	1.03	2.73	.58	4.02***
Use information ethically, legally and respectfully	2.84	.66	2.65	.59	3.21**

A comparison of information behaviour between first-year and second-year cohorts is shown in Table 5. Capacity for analysis and synthesis and computer literacy have significant differences between the two cohorts. Further, both groups scored the highest for decision-making skills, which is equivalent to the application of information, as shown in Appendix 1. Overall, H1 is partially supported.

Table 5: Information behaviour

	Second-year cohort		First-year cohort		t
	Mean	**SD**	**Mean**	**SD**	
Computer literacy	2.91	.58	2.77	.56	2.539*
Capacity for analysis and synthesis	2.77	.39	2.66	.49	2.954**
Information management	2.76	.41	2.66	.45	1.618
Decision-making	2.93	.57	2.83	.72	1.714
Organization and planning	2.78	.41	2.68	.53	1.881

We conducted a series of regression analyses on each information skill to identify whether individual and family characteristics influence the skills. The results only where these characteristics significantly predict are shown in Table 6. Skills to access needed information are significantly influenced by sex, and the existence of siblings, where females possessing more skills than their male counterparts and undergraduates with none or fewer siblings possessing more skills than otherwise. Further, skills to manage information and skills to apply information were also significantly influenced by individual and family characteristics. In detail, skills to manage information are significantly influenced by sex and mother being a housewife/paid employment, where females showing the possession of the skill more than their male counterparts and undergraduates who have their mother as housewives showing the possession of the skill more than their counterparts. Furthermore, skills to apply information are significantly predicted by sex, where females showing the possession of the skill more than their male counterparts.

Table 6: Effect of individual and socio-demographic characteristics on information skills†

	Access needed information				Manage information				Apply information			
	Beta	**R^2**	**Adj R^2**	**F**	**Beta**	**R^2**	**Adj R^2**	**F**	**Beta**	**R^2**	**Adj R^2**	**F**
Z Score	.092	.054	.039	3.785*	.042	.036	.022	2.549*	.033	.025	.010	1.723*
Age	.072				.068				.045			
Sex	-.152**				-.104*				-.123*			
Siblings	-.119*				.027				-.069			
Grand-parents/ relatives lived	.000				.036				.026			
Mother's role	.020				-.124*				-.023			

Note: information skill components with significant results are shown†

We also conducted a series of regression analyses on each information behaviour to identify whether individual and family characteristics predict these. The results only where these characteristics significantly predict are shown in Table 7. Information management is significantly predicted by sex and mother being a housewife/paid employment, where females showing the possession of the skill more than their male counterparts and undergraduates, who have their mother as housewives showing the possession of the skill more than their counterparts. Further, decision-making is significantly predicted by sex, where females possessing more skills than their male counterparts.

Table 7: Effect of individual and socio-demographic characteristics on information behaviour†

	Decision-making				Information management			
	Beta	**R^2**	**Adj R^2**	**F**	**Beta**	**R^2**	**Adj R^2**	**F**
Z Score	.042	.038	.023	2.612*	.065	.034	.020	2.346*
Age	.070				.060			
Sex	-.161**				-.163**			
Siblings	-.063				.029			
Grandparents/ relatives lived	.003				-.039			
Mother's role	-.022				-.119*			

Note: information behaviour components with significant results are shown†

We created Table 8 to compare the results presented in Tables 6 and 7. The item measures of each component of information skills and information behaviour are given in Appendix 1. Overall, H2 is partially supported.

Table 8: Summary – significant individual and socio-demographic characteristics

	Information skills	**Information behaviour**
	Manage information	Information management
Sex	√	√
Mother's role	√	√
	Apply information	Decision-making
Sex	√	√
	Access needed information	†
Sex	√	
Siblings	√	

† equivalent information behaviour component is not available, refer to Appendix 1.

Discussion and Implications

We investigated the IL of two undergraduate cohorts in Sri Lanka. The results showed that the level of possession and competence in IL of the two groups. First, results showed that both the possession of IL measured with information skills scale of Clark and Catts (2007) and confidence in IL measured with information behaviour scale of Pinto and Sales (2007) showed that the second-year cohort who had undergone IL instruction scoring higher than their first-year counterparts. Further, as shown in Appendix 1, the two scales used for the study measured the same areas of IL, where one scale measured possession of skills while the other measured confidence in the use of the skills. The results showed that the ranking order for both information skills and information behaviour do not vary between the two groups. However, as discussed below in detail under implications of the findings, the ranking order

for both information skills and information behaviour across two groups does not vary. For example, when considering information skills, both first-year cohort just entered the university and second-year cohort who completed academic instruction on IL reported having higher IL in the application of information and lowest IL in managing information. Second, the findings showed some differences between the two groups in information skills and information behaviour with partial support for H1. Third, the findings revealed individual and family characteristics that influence IL. As discussed in the below paragraphs in detail, our study contributed to the existing literature in several aspects and has implications for the current practices.

Theoretical contributions of the findings

First, the IL literature identifies the field of user-focused studies as important since outcomes of such studies are helpful if designing better instructional programmes acknowledging users' IL gaps. Building on the IL literature on user-focused studies such as Pinto and Sales (2007) and de Arenas et al. (2014), we investigated engineering undergraduates in a university in a developing country. When literature does not provide sufficient knowledge on users from different study disciplines such as engineering and different region/country contexts, it limits the advancement of knowledge and the understanding of the applicability of Western-based methodologies in other parts of the world. Therefore, our study is novel and contributes to the existing literature.

Second, students who make the transition from secondary to tertiary education were found to possess an inadequate level of IL appropriate for university degree programmes (Gabridge et al., 2008; Lwehabura, 2016; Price et al., 2011). An understanding of users' existing levels of IL and the areas of improvement are the basis for designing instructional programmes. Unless their IL is assessed at the beginning of the studies at the university, the libraries find difficulties in designing instruction programmes addressing the real needs of the students. The literature provides evidence for different designs of user studies. For example, Seamans (2002) and Michalak et al. (2017) provide evidence of conducting user studies to identify particular user cohorts about their information needs and use. Some other studies provide evidence of pre and post-tests of the same study sample. For example, Price et al. (2011) investigated first year business undergraduates' IL skills before and after instruction programme at an Australian university. In this respect, as a used-focused study, our study is novel in its approach since we provided evidence of entry-level students' IL and compared their skills with their immediate seniors who had IL instruction in the discipline of engineering.

Third, we used two different scales to evaluate IL- information skills scale and information behaviour scale. The literature supports the use of the self-assessment method and reveals that self-reported measurement scales are as

reliable and valid as IL test scores (Gustavson and Nall, 2011, p 299). Although the items in these two scales correspond to similar IL areas (IL components), the two scales measured two different things. The information skills scale measures the perceived level of possession of IL whereas the information behaviour scale measures the perceived level of general competence achieved. In this regard, Bandura (1977) makes a differentiation between the possession of skills and the confidence in the use of the skills. The latter known as self-efficacy is identified as a belief in one's capabilities to successfully organize and execute a particular behaviour or task (Bandura, 1997). Bandura (1977) states that the possession of necessary skills alone is not sufficient to attain success but also confidence in the use of the skills is required. Therefore, by using these two scales we evaluated both possession of and confidence in the use of IL skills. The empirical research that investigated both these aspects in a single study is very rare or none exist in the IL literature. We found, on the one hand, that there were similarities between a particular group for information skills and information behaviour. For example, the first-year cohort's scoring pattern (or ranking) is the same for both scales as shown in Table 3. The first-year cohort scored the highest for the application of information. On the other hand, the first-year cohort's scoring pattern (or ranking) and second-year cohort's scoring pattern are the same for both scales as shown in Table 3. This suggests several aspects: a) At the entry-level to the university, the first-year cohort is comparatively possessed higher skills in applying information, accessing needed information, and use information ethically, legally, and respectfully; this cohort is comparatively more confident in decision making, computer literacy, and organization and planning. Both first-year cohort's and second-year cohort's Z scores are almost the same and from the same discipline. Second-year cohort even after receiving instruction depicts to possess higher skills in applying information, accessing needed information, and use information ethically, legally, and respectfully; comparatively more confident in decision making, computer literacy, and organization and planning. In other words, after academic instruction, all dimensions of IL improved, but no changes in the ordering across IL dimensions. Both groups are comparatively weak in both possession and confidence to use of IL in managing information and analysis and synthesis of information; and b) as shown in Table 4 and 5, there are significant differences in IL between the two groups. The possession of IL skills for accessing needed information, applying information, and using information ethically, legally, and respectfully is better in the second-year cohort than the first-year cohort. The confidence in computer literacy and capacity for analysis and synthesis is better in the second-year cohort than the first-year cohort. Although it is possible to speculate that instruction improved the second-year cohort's IL in all dimensions, the instruction may have deficiencies in making higher levels of improvement in areas where the students are weaker. Although our study

is not designed as a pre-and post-test of IL of the same sample, our findings also led us to speculate whether IL instruction makes a real difference. In this regard, the present-day undergraduates can be described as Net savvy and better in basic computer skills and using Internet-based search engines, still, their possession of skills and confidence need to be improved in the areas such as the capacity for analysis and synthesis. When interpreting our results from this angle, our findings support previous studies of Michalak et al. (2017), and Ali et al. (2010). Further, as reported by Petermanec and Šebjan (2017), our findings also support the contention that instruction increases possession and confidence in IL.

Fourth, we investigated whether socio-demographic characteristics predict IL skills. In doing so, we investigated individual demographic characteristics commonly used in the literature such as age and sex. We also used results obtained in the university entrance examination, which is a measure of academic performance. In addition, we used three family-related characteristics that would be interesting as a developing country as well as an Asian country. These three characteristics were the existence of siblings, having relatives such as grandparents or other relatives living with the family, and the mother's main role (paid employee or housewife). As shown in Table 8 the results did not reveal deviations in predictions based on the scale used, and the results showed that females, having a mother as a housewife, and none existence of siblings or having few siblings lead to possessing and confident certain IL components than otherwise. In this regard, although Catts and Lau (2008) suggest that family patterns and cultural and social factors could influence the way need information is expressed and handled, we have not come across studies that considered these. When considering sex, although Whitmire (2001) had not identified any sex differences, our study revealed females reporting higher levels of possession and confidence in applying information, managing information, and accessing needed information by females. When considering the role of mother, the Department of Census and Statistics of Sri Lanka (2005) the changing pattern of educated women since 2005. In the year 2005, of the total population, 48.2 per cent were economically active – males 67% and females 33%. For the first time in 2005, it is recorded that of these economically active females, 22% had General Certificate in Education (Advanced Level) that equals 13 years of education or above qualification compared to 13% of economically active males having the same level of education. This trend of finding more educated women in the population still prevails. Therefore, it is possible to speculate that undergraduates who reported their mothers as housewives, could have appreciable levels of educational background. This may have led undergraduates to possess and be confident in managing information. Overall, by incorporating individual and family characteristics, we extended the existing literature and provided new insights for academics, researchers, and policymakers.

Implications of the findings for practice

First, the findings suggest that even though the second-year cohort is exposed to instruction on IL, their level of achievement is moderate for all IL components. Therefore, more instruction is needed throughout the degree programme. May be embedded in the curricular. This provides challenges to faculty and libraries. The findings suggest that students are not equally competent in all dimensions of IL. Therefore, identifying relatively weaker and stronger dimensions, and identifying referred mechanisms for learning different IL dimensions is important. Assessment of IL at the beginning, at the end of the academic instruction as well as over the degree programme will provide a better understanding of improvements in students' IL.

Second, there is a need for formal academic instruction for students to achieve the desired level of IL that corresponds to their level in the degree programme. The findings suggest the value of collaboration between librarians and faculty in this regard since IL is no longer an issue concerned with libraries but rather an issue in learning or education. The findings of the study made a case for partnerships between libraries and faculty in designing practitioner-centred curriculum-based Il instruction over the degree programme.

Third, in connection to the above, designing and delivering curriculum-based IL instruction for undergraduates to learn, practice, and refine their skills and to develop confidence in the use are goals endorsed by international and national bodies, adopted by universities, and implemented by libraries and faculty at the degree propgramme level in the West (see Flierl et al., 2020). However, in developing countries, the importance of IL has yet to take hold. In Sri Lanka, IL strategies, standards, policy guidelines, and models for IL instruction do not exist at either national or university levels that explicitly emphasize IL. Sri Lankan universities face challenges in providing IL systematically due to lack of guidance, shortage of funds for information sources, and technological support.

Fourth, findings on undergraduate users and their possession and confidence in IL are the basis for the development of user-centric library services. The findings of users' IL is important in reaching out to undergraduates from different disciplines, like engineering, and making adjustments to library services to better serve respective undergraduate cohorts.

Conclusion

We investigated two undergraduate cohorts on their possession and confidence in the use of IL. Of the two cohorts, one had undergone formal academic instruction on IL during the degree programme. Although this group showed higher levels of IL in both possession and confidence in the use, their IL is moderate across all IL dimensions that we investigated. The study

also found some individual and family-related characteristics that predict both possession of IL skills and confidence in the use. Since IL is a requirement for survival and success during the university programme and beyond throughout their lives, the findings made novel contributions to the existing literature and provided implications for practice, as discussed in detail in the above section. Therefore, while this study was conducted in Sri Lanka, the findings have applicability to many contexts worldwide and will be useful for various stakeholder groups such as researchers, academics, librarians, and policymakers.

Limitations and Future Research

First, we investigated two different undergraduate cohorts. Inclusion of the first-year cohort in addition to the second-year cohort, who undergone academic instruction on IL added value to our study. The findings relating to the second-year cohort are post-test and the findings report moderate levels of possession and confidence to use the skills. Still, our results do not provide pre and post evaluation of IL of a particular study sample. The study would have followed up with the first-year cohort after being exposed to formal IL instruction. This data would be valuable for course review. This is a limitation of the study. Future research could collect data from the same batch of students before and after being exposed to formal IL instruction. Second, if we extended the study to investigate the first-year cohort and/or second-year cohort until they graduate after completing all four years of the undergraduate programme, we could have observed improvements in IL over the degree programme. Third, some previous research suggests that different populations could have different views of students' IL, such as undergraduates, faculty members, and librarians (see DaCosta, 2010; Williams & Wavell, 2007). We investigated the views of students. Future studies could investigate aspects such as the value faculty place on IL and views on having IL as part of curricular. The librarians could be investigated to obtain data on their experiences of working with faculty in delivering IL instruction, faculty members' willingness to incorporate IL into learning outcomes of the degree programme/courses. Therefore, future studies can triangulate the data. Fourth, the results inclined us to assume that instruction provided improved the dimensions of IL to moderate levels but have not fully met the expectations. Even after the instruction, lower-performed dimensions remained lower without reaching or surpassing better-performed dimensions. This led us to question, what are the undergraduates' instructional preferences for IL dimensions? They may have different preferences, for example, for the evaluation of information and information sources, capacity for synthesis, and managing information. However, we investigated possession of IL skills and confidence in use. Therefore, future research could investigate whether

undergraduates' instructional preferences vary by the dimensions of IL. Further, further research could investigate whether instructional preferences vary according to individual and family characteristics. Finally, we found that skills to manage information are significantly predicted by the mother's role- a housewife or in a paid employment. When a mother is a housewife, students showed the possession of certain IL skills more than their counterparts whose mother was in paid employment. In Sri Lanka, the education levels of people are at higher levels compared to other developing countries. Therefore, future research could investigate whether the education level of mother moderates the relationship between a mother's role and the IL of undergraduates.

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Appendix

Appendix 1. Item measures of the scales

Information skills scale (Clark & Catts, 2007).	**Information behavior scale (Pinto & Sales, 2007)**
Access needed information: I use a combination of search tools including library catalogues and web search engines. I have a system for searching for information on a subject. If my search returns too much irrelevant information, I change my keywords. I decide how best to find the information I require for a particular task.	*Computer literacy:* Ability to use the computer as a work tool Familiarity with the library's website Knowledge of how to access specific internet resources Access to user training in information search techniques
Evaluate information and information sources: I critically evaluate each information source I use. I evaluate the information I read for accuracy and relevance. In selecting information, I evaluate the quality of the information. I revise my search plan and strategy if I need to gather more information or data	*Capacity for analysis and synthesis:* Ability to analyse and synthesize information Knowledge and application of reading and highlighting techniques Ability to summarize information and present it in a succinct fashion Ability to take notes in class in an effective fashion Ability to summarize information from multiple sources

Information skills scale (Clark & Catts, 2007).	**Information behavior scale (Pinto & Sales, 2007)**
Manage information: I have a system that helps me to organize the information I need. I keep accurate details of everything I read. When I make notes about the information I am reading, I include the author and title. I develop a system to keep track of the information I find and its sources.	*Information management:* Proper documentation of one's work Ability to organize one's information system Use of the library for information search Library science skills for orienting information need Use of encyclopedias, dictionaries, and databases to locate concrete information Ability to evaluate information from any medium or support Ability to present one's knowledge
Apply information: When I get a new idea, I work out how to explain it effectively. I present the information in a medium that suits the audience. When I present the information, I have found, I state the key ideas in my own words. I compare information as I'm reading with what I already know.	*Decision-making:* Efficient decision-making skills
Use information ethically, legally, and respectfully: I include the web pages that I referred to for my assignments in the reference list. I am concerned about policies regarding plagiarism. I need to keep re-learning because life is constantly changing. I follow the instructions on the use of the intellectual property.	*Organization and planning:* Ability to structure and draw up essays Experience in group work Familiarity with the policies existing in one's work context on publication and dissemination of information

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Acceptance of Electronic Information Resources by Library Users: A Review of Literature from the Asian and African Perspective

B.M.M.C.B. Hindagolla & S. Weerasinghe

Abstract

This paper provides a comprehensive review of the available literature from past 20 years (2000-2020) that had focused on Technology Acceptance Model (TAM) applied in libraries in order to evaluate the Electronic Information Resources (EIR) usage. The main objective of the study was to identify factors influencing electronic information resources usage in libraries across the Asian and African contexts. This review was conducted by an extensive search of related literature in Google scholar, Science Direct, Emerald and EBSCO host academic portals and original scholarly articles published between the time span of 2000-2020 were selected for the review. In addition, hand searched articles applicable to this review were also considered. Findings demonstrated that TAM was a parsimonious model that successfully explained the acceptance of EIR in the library context. The study addresses gaps in which future research can be placed as well as contributes to the theoretical novelty of existing literature in the realm of TAM and EIR.

Keywords: *Technology Acceptance Model, Electronic Information Resources, Perceived Ease of Use, Perceived Usefulness, Behavioral Intention, User Acceptance.*

Introduction

Globalization, technology and the rapid development of Information Communication Technology (ICT) have made an unremarkable impact on global education. The advancement of information technology has changed the way of learning and conducting research. As a result, the patterns of

teaching as well as systems of learning are being transformed into new methods. Consequently, the new transformation has changed the way of access, storage and dissemination of information in libraries. The mission of an academic library is to support their university by serving as a focal point for providing academic information to the learning and research community. Today, academic libraries are striving to provide their services blended with emerging digital technology. Digital technology has significantly influenced the method of information dissemination and the avenues of information seeking. Therefore, academic libraries have shifted their traditional role and extended their wings to multidimensional aspects (Anunobi & Okoye, 2008; Nanenna & Emanike, 2015). In this environment, libraries throughout the world are now transferring to hybrid libraries. According to Campbell,

> "Numerous creative and useful new services have developed within academic libraries in the digital age: providing quality information resources, offering electronic information resources and services, teaching information literacy, collecting and digitizing archival materials and maintaining digital repositories" (Campbell, 2006, p.17).

Electronic Information Resources (EIR) are invaluable information sources that deliver information to users in the electronic mode. (Millawithanachchi & Jayasundera, 2009). According to the Online Dictionary of Library and Information Science:

> "Electronic Information Resources are the materials consisting of data and or computer program encoded for reading and manipulation by a computer or by using a peripheral device directly connected to the computer, such as a CD- ROM drive, or remotely via a network, e-resources includes online catalog, software applications, electronic texts, bibliographic databases, CD ROM databases, Online databases, e-books, e-journals etc." (Reitz, 2004).

Swain and Panda (2009) considered e-resources as reservoirs of information that may be extracted via numerous electronic devices such as computers, smart phones, tablets, etc. Moreover, "they are fine grained and restructured and often stored within the cyberspace in a compact form" (Mawere & Sai ,2017, p.02). Further, Nicholas et al. (2017) verified that the use of electronic resources, such as search engines, were highly popular among early-career researchers irrespective of country, language and discipline. Consequently, academic libraries are investing huge amounts of money to subscribe electronic information resources to provide easy and efficient services to their user community, such that end users can access them by intranet or internet. But there are many unanswered questions regarding user acceptance and their satisfaction particularly of EIR and its usage. Literature demonstrates ample studies which had focused on examining technology acceptance or adoption of information systems and new technologies. But a comprehensive review of

literature on EIR acceptance, e-library or digital library acceptance in the context of Library Science is limited. There were a considerable number of studies conducted by researchers in Asian and African contexts to identify the factors that influenced the use of EIR in libraries. Among them there were studies which utilized Technology Acceptance Theories to predict users' acceptance behavior and to identify factors that influenced EIR usage. The current study seeks to examine factors influencing EIR use in libraries via reviewing related literature limited to the Asian and African contexts. In order to successfully achieve the aim of the study following objectives are established:

Objectives of the Study

The objectives of the study are:

1. To explore factors that have an effect on the use of electronic information resources in libraries based on past studies in the literature.
2. To identify the most influential factors affecting the behavioral intention to use EIR.
3. To recommend further research areas on this research arena

This study intends to summarize the most significant findings of previous studies engaged with Technology Acceptance Model (TAM) applications. Researchers who attempt to carry out future work in this domain will gain immense benefits from this comprehensive summery compiled under one heading.

Technology Acceptance Theory

Acceptance and rejection of new technologies are influenced by user perceptions and beliefs. Users would accept an information system only if that system can offer value to a person, institute or country (Weerasinghe & Hindagolla, 2018). User acceptance of technology has been an important field of study for over two decades (Chuttur, 2009). Recently many studies have been carried out in the area of information systems adoption. The objectives of these studies were to investigate usage and examine obstacles along with usage and intention to use the technology. In order to predict and explain the acceptance and use of a technology it is necessary to understand why people use or not use that technology. There are a substantial number of user acceptance models and theories which have been developed by many researchers in the information systems field. Those theories and models are engaged in explaining and predicting user acceptance over many settings. Among Technology Acceptance Theories, TAM has captured the most attention of the Information Systems Community (Kim, 2006). According to Han (2003) and Kim (2006) TAM is very frequently applied by researchers in

the information systems or technology adoption domain. Also, it is a simple model that could be easily adopted into a variety of contexts (Weerasinghe & Hindagolla, 2018).

Technology Acceptance Model (TAM) was developed by Fred Davis in 1986. This model evolved as a theoretical extension of the Theory of Reasoned Action. It was mainly designed for explaining users' intention towards the computer (or new technology) use or acceptance (Davis et al., 1989). The model has two constructs namely, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) According to Davis (1989), these two factors are the major motives of the users' behavioral intention to use technology (Davis, 1989). Perceived Usefulness is the "degree to which a person believes that using a particular system would enhance his or her job performance" (Davis 1989: p.320). Davis (1989) defined Perceived Ease of Use (PEOU) as "the degree to which a person believes that using a particular system would be free of effort" (Davis 1989: p.320).

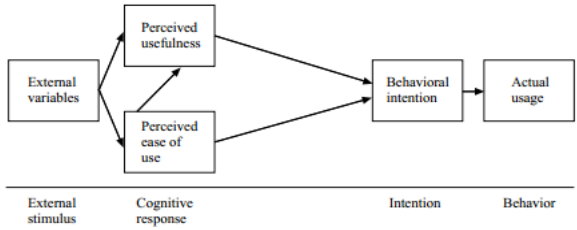

Figure 01: Technology Acceptance Model (TAM)
Source: Davis and Venkatesh (1996, p.20)

The TAM shows that a person's actual use of technology is determined by the Behavioral Intention (BI). Behavioral intention is produced from a combination of attitude towards behavior, the subjective norm and perceived behavior control (Ajzen, 2002) It is hypothesized that BI is mediated by PU and PEOU (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). TAM explains that external variables will exert influences on technology adoption through PEOU and PU (Szajna, 1996). Various individual differences and situational constraints manipulate these external factors (Hong et al., 2002).

TAM is one of the most influential and frequently tested model that has been developed to explain and predict users' information system usage behavior (Surendran, 2012)) Also, It has been listed in Google Scholar with over 50 000 citations accounting to the journal article that introduced TAM (MIS Quarterly, 1989).Similarly, Taylor and Todd (1995) confirmed that TAM provided factors which lead to information system acceptance while enabling extensions and elaborations better than other competing models (Attuquayefio et al., 2014).

Methodology

In order to identify relevant studies, an electronic search was conducted through indexed databases and other academic portals such as Google scholar, Science Direct, Emerald, EBSCO host academic portals which consisted of original research articles published between 2000-2020. In addition, hand searched articles applicable to this review were also taken into consideration. Then, titles and abstracts of the studies were reviewed to identify the most appropriate and relevant articles in the field. Keywords and phrases used in the literature review were "electronic information resources" and "Technology Acceptance Model", " e-resources" and "Technology", "online resources of libraries" and Technology Acceptance Model", "E-library" and "TAM", "Electronic Library" and "TAM", "Digital Libraries" and "TAM". Articles excluded from this review were studies that focused on EIR acceptance in libraries and other Technology Acceptance Models. Studies carried out without using a model were not taken into account in this study. Additional exclusion criteria were studies written in another language and focused on usage of electronic information resources, digital library e-library, electronic library, online information resources.

Empirical Studies conducted on TAM variables in the Library Context

Mawere and Sai (2017) investigated the adoption and utilization of e-resources by undergraduates in Great Zimbabwe University. Technology Acceptance Model was applied to conceptualize the study. 576 students were selected as a sample out of 13500 total students. The sample of the study was selected using stratified sampling method according to faculties and departments. Findings of the study indicated that there was a significant relationship between unavailability of relevant e- resources and PU of e-resources. Similarly, the results showed that lack of training and support staff, lack of technical knowhow, lack of assistance from library staff, difficulty of access to e- resources were directly affected by the perceived ease of e-resources use. Moreover, study findings demonstrated that external factors directly influenced students' intention to use electronic resources (Mawere & Sai, 2017).These findings further confirmed the already established TAM relationships. In a related study, Gbenga (2016) carried out a survey to determine to what extent perceived ease of use (PEOU) was associated with use of EIR. Further, this study examined the relationship between PEOU and use of EIR. Using multiple stage sampling method, 621 students were selected as the sample. Questionnaire was the main research tool used to collect data. Findings revealed that majority of respondents disagreed with the facts of; the interaction regarding EIR was clear & understandable, flexible and easy to become skillful. Moreover, study findings showed that there existed a

significant relationship between undergraduates' PEOU of EIR and their use. The author concluded that PEOU had a positive relationship between EIR usage ($p=0.00;p<0.05$)(Gbenga, 2016). These study findings are consistent with Mawere and Sai (2017).

In a similar study, Vaghela and Thaker (2016) examined behavioral intention to use EBSCO online management database by college students in Luthra Institute of Management, Gujarat India. Authors conceptualized the model using TAM constructs and two external variables. The proposed model was tested empirically using survey data gathered from 148 Management and Business Administration students. Findings indicated that user attitude (0.54) and PU (0.32) were the most significant determinants of the behavioral intention to use EBSCO database. Both PEOU and PU were identified as significant for user attitude. Study relevance factor was a significant determinant of both PEOU and PU. However, previous experience had no effect on both the TAM belief variables. In this study, the major constructs of PU and PEOU had an impact on students' attitudes and behavioral intention to use EBSCO database which was in accordance with TAM original results (Vaghela & Thaker 2016). Further, in line with above studies Al-Alawi and Noor (2020) investigated factors that influenced faculty members' attitudes towards accepting e-resources at higher education institutes in Oman. Researchers mainly focused on individual differences impacted on academic's adoption of e-resources. A survey was carried out among a sample of 450 academics in Sultanate University to collect data. It was revealed that PU had a positive effect on behavioral intention to use e-resources (PU=0.508). Further, results confirmed that PEOU had a significant positive effect on PU (PEOU=0.592). However, PEOU had a lower effect on academics' behavioral intention to use e-resources, compared with perceived usefulness (PU→BI=0.508) (PEOU→BI=0.432). In addition, individual differences namely, self efficacy, computer competency, English competency and academics attitudes had significant effects on behavioral intention to use e-resources. Academics' attitude (AA→BI=0.735) had a greater effect on BI than other variables. Moreover, the study also confirmed that there was a direct relationship between external variables and TAM belief variables which affected the BI. These study findings are in line with Vaghela and Thaker (2016) and Mawere and Sai (2017).

Joshua and King (2020) also attempted to evaluate the utilization of e-resources by undergraduates & academic staff in Modibbo Adama University of Technology, South Nigeria. The researchers proposed a research model combining TAM and Diffusion Innovation Theory (DIT). A survey was carried out among 1223 university undergraduates and academic staff members to test the proposed model. It was revealed that PU and PEOU had an effect on attitudes and decision process of academic staff and students' utilization of e-resources (Joshua & King 2020). Similar to above the study, Izuagbe et al.

(2016) also tested a hybrid model combining TAM and DIT. It examined the moderating effect of productivity and relative advantage (RA) on PU of EIR adoption in private university libraries in Ogun and Osun states of Nigeria. Survey research design was used and 7-point likert scale questionnaire was distributed among 116 library personals in 13 private universities in Ogun and Osun states. Collected data were analyzed applying descriptive statistics. Results revealed that productivity and relative advantage were strong moderators of PU towards EIR adoption. This study mainly focused to what extent other attributes affected PU and adoption behavior of EIR. PEOU was excluded from this study. Therefore, authors suggested that further research was required to incorporate more innovative characteristics like compatibility, complexity in DIT as well as PEOU and attitude in TAM for an all-inclusive understanding of EIR adoption among library professionals (Izuagbe et al., 2016).

Another similar study was carried out by Budu in 2015, to find out the level of EIR use by students of Akrofi- Christaller Institute of Theology, Mission and Culture and the Ghana Technology University College. The study applied TAM to measure the relationship between PU, PEOU and actual use of EIR. The study adopted the survey method and a questionnaire was administered to collect data from 120 students of ACI and GTUC who were selected through the convenience sampling technique. Study findings indicated that there was a positive correlation between actual usage of EIR and PU (β=633). The findings also showed that PU explained 40% (r^2=0.40) of variation of the actual use of EIR. It meant that usefulness of EIR contributed to 40% of students' actual usage of EIR. Further, results demonstrated that the correlation coefficient was 0.734 for the relationship between actual usage and PEOU. The coefficient of determination was 0.54 (r^2=0.54) which indicated that 54% of the variation in actual usage was explained by PEOU. The study findings confirmed that PEOU had a high level of contribution to the actual usage of EIR than other variables. Thus, the author concluded that increasing the level of PU and PEOU of EIR by students will lead to a significant increase in the level of actual usage, with PEOU exerting a relatively higher magnitude of influence (Budu, 2015).

Ju and Albertson (2015) examined the influence of certain user-driven factors on the intentions to use video digital libraries employing 229 respondents via an online survey. Researchers postulated a research model based on original TAM variables and four external variables. The research model was tested using multiple regression analysis and correlation coefficient techniques. It was revealed retrieval functionality (β=0.279), user interface (β=0.351), user support (β=0.267) and collection quality (β=0.365) showed significant associations with intention to use video digital library resources. PEOU (β=0.539) and PU (β=0.495) also demonstrated significant associations

with intention to use video digital library resources (Ju & Albertson, 2015). These findings were congruent with original TAM establishments.

Tella (2011) studied predictors of e-library acceptance of undergraduates in University of Ilorin, Nigeria. Researcher theorized a research model based on original constructs of TAM with 6 external factors namely, social influence, Relevance, Usage, Awareness, Satisfaction and Computer/Internet efficacy. The survey research design was applied and a structured questionnaire was used to gather data from 1500 e-library users of the university. Results indicated that all nine e-library acceptance constructs made 69% of users' acceptance of e- library. Moreover, findings showed that PEOU made the most significant contribution to the e-library acceptance (β*=0.084, t =5.27) and other external factors made a significant influence on the acceptance of e-library acceptance in the following order: actual use (β =0.95, t=3.10), relevance (β=0.301, t=3.01) and* awareness (β = 0.75, t = 1.88) while social influence made the least prediction (β = 0.158, t = 1.40). These findings suggested that all constructs were good predictors of the e-library acceptance (Tella, 2011).

Jeong (2011) also studied the user perceptions and behavioral intentions towards the e –library in a Korean Elementary School. Utilizing the TAM with external variables which consisted of two individual differences, three interface characteristics and two system characteristics, the author measured the influence of the intention to use an e-library. The sample consisted of Korean elementary students who used an e- library system called booktobi. A survey was carried out in 2009 using 395 students. Results of the study demonstrated that interface characteristics can indirectly influence the PU via the PEOU of e-library system use and that System Characteristics can directly influence the PU. In addition, it was evident that System quality positively influenced both PU and PEOU. The total influence of the PEOU could be singled out as a primary determinant of Behavioral Intention. Study findings showed that both PU and PEOU were significant determinants of Behavioral Intention to use an e-library system (Jeong, 2011).

Another study was carried out by Park et al. in 2009 regarding the user acceptance of a digital library system in developing countries with the application of TAM. This study examined the factors that influenced user adoption and use the digital library system called TEEAL, and tested the applicability of the TAM in developing country context. This study applied the TAM belief constructs with eight external variables. This was empirically tested with 16 institutions in Africa, Asia and Central America. A questionnaire was used to collect data from 1082 students. Study findings confirmed that PEOU had a significant impact on PU. But an indirect effect of PEOU on the Behavioral Intention to use was also found. Experience in computer systems, domain knowledge, English literacy, library assistance and relevance

had direct effects on PEOU whereas interest in publishing, English literacy, relevance and library assistance had direct effects on PU. Authors confirmed that both key variables and external variables were found to affect users' behavioral intention. Therefore, authors suggested that the above important factors should be considered when designing, implementing and operating digital library systems (Park et al., 2009).

Thong et al. (2002) carried out a study about the role of interface characteristics, organizational context and individual differences in the context of digital libraries. The authors sought to understand how users accept digital libraries by utilizing TAM. Open University of Hong Kong library users have taken part in this study: 397 students participated in this study. Study results confirmed that both PU and PEOU were significant determinants of the intention to use digital library. PU was a much stronger predictor of the intention to use digital library in comparison to PEOU. The effects of external variables on PU and PEOU were also supported. Further, the findings indicated that interface characteristics, organizational context and individual differences were important predictors of PU and PEOU of digital libraries (Thong et al., 2002).

Conclusion

This study presented a comprehensive review of previous studies that applied TAM to evaluate the acceptance of EIR by library users. It demonstrated that TAM was a vigorous model in the prediction of user acceptance of EIR in the library context. Many study findings discussed in the review further proved the establishments of original TAM findings across different research contexts. In comparison to PU, PEOU was found to be a stronger determinant of the behavioral intention to use EIR in many studies. However, PU had a positive influence on attitude and behavioral intention using EIR. In addition, external variables such as individual differences namely, self efficacy, computer competency, English competency, academic attitudes, Relevance, Usage, Awareness, Satisfaction and Computer / Internet efficacy were identified as important variables in the acceptance behavior of EIR.

It was evident from this review that many studies have been conducted in academic library settings using students as research subjects. Thus, it is suggested that future research beyond the academic library context should be conducted. Also, similar TAM based studies can be conducted by using other categories of library users such as academic staff members, researches, etc. since behavioral intentions towards EIR can vary depending on the user category. Also, studies that have considered library professionals' intentions towards EIR use is scare and hence it would be interesting to explore EIR use

behaviors from the perspective of library professionals. Further, this review exhibited that most studies have entirely utilized quantitative research methods to validate their work. Therefore, in future research it is important that researchers integrate qualitative research methods into their studies. Qualitative data collection techniques such as focus groups, semi-structured interviews can be employed to support survey data. This would in turn enhance the understanding of user acceptance regarding EIR. Moreover, it would be useful to enrich the TAM findings further as well as identify deficiencies. Yet, this review was limited to the contexts of Asia and Africa; therefore, similar literature reviews can be conducted spanning contexts of developed countries in future.

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40

Exploring the Usage of Library Resources by UG and PG LIS Students of Dr. Rammanohar Lohia Avadh University Central Library of Ayodhya Uttar Pradesh: A Case Study

Dr. Shiv Kumar

Abstract

The article highlights the usage of reading materials by library users especially concerned to undergraduate and post-graduate students of library and information science. The study examines the purpose of using information resources and also explores which types of problems are faced by library and information science students whenever they are access the reading materials. The findings of the study, majority of the users are using reading materials for completion of assignment work and the study also found that most of the users preferred books rather than non- print materials but due to the availability of old reading materials documents, lack of less availability of e- resources, users are faced the problems in the library.

***Keywords**: Library, users, reading materials- print and non- print, problems faced.*

Introduction

Library is the knowledge centers where information resources are acquisition, process, storage and dissemination to existing users as well as conservation and preservation of reading materials for potential users. Due to drastically emergence of information communication technologies and information explosion as well as changing users' information taste, the responsibility of the library is increasingly much to adoption of information

communication technology and assessing the user's information needs and taste. The library is not only conservation and preservation of information resources, providing services but also stimulation the research activities in the campus though offering specialized services to particular users. Singh and Kushawaha (2020) mention in their study, library is widely role played in stimulation of research activities and enhances the output of an institution.

Review of Literature

Noh, Lee & Choi. (2018) discussed the role of librarians in the context of offered library product and services. For the study a survey research method was used to get primary data. They found that 100% librarians were widely role played to offer various services for entire users. Authors found that in their study, librarians were promotion of reading habits, assess the needs of information and made serviceable of reading materials to users for use.

Hanchate & Sawant (2018) stated that usage of information communication technologies in library for offered ICT based services. For study survey research method was used and questionnaire was used a tool for gathering primary data. Authors found in their study; majority of the academic libraries are offered various types of ICT based services.

Ekere (2016) describe the main pillar of library. Author said that information resources, services and users are the core element of library. For this study, Author examines the satisfaction level towards library services. The findings of the study, majority of the users are satisfied to the library services.

Kumar & Singh (2014) examined the basic difference of online public catalogue and manual catalogue. For the study authors were used a survey research method and investigate the users search style technique. The findings of the study, the significance differences were received in both. Although authors said that majority of the libraries were using OPAC and Web OPAC utility application in library.

Objectives

1. To find out the purpose of using reading materials
2. To identify the resources usage by LIS students
3. To investigate the problems faces by LIS students while accessing the information resources.

Research Methodology

For the present study, survey research method was used and questionnaire was used a tool for getting primary data. The sample size of the study is total of 65 respondents. Due to COVID -19 and closed the university, the questionnaire

was distributed through online in google form. Total 70 questionnaire were distributed among undergraduate and post-graduate library and information science student of them 65 questionnaires were received. So, for the data analysis only 65 questionnaires have been taken and the data presentation are presented in both table and figure form. MS- Excel was used a tool for analysis of primary data.

Scope and Limitation

The scope of the present study is limited to Dr. Rammanohar Lohia Avadh University, Ayodhya, Uttar Pradesh. The study is covered only under-graduate and post-graduate students of department of library and information science at Dr. Rammanohar Lohia Avadh University

Data Analysis and Interpretation

Table 1: Response rate of Respondents

Questionnaire distributed	Questionnaire received	Percentage
75	65	86.67

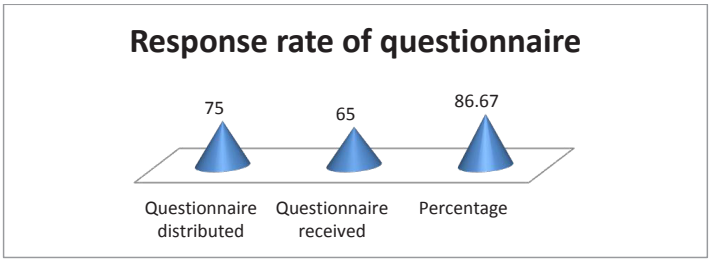

Figure 1

Table 1 and figure 1 show the response rate of questionnaire so respondents. The above table and figure indicate that total 75 questionnaires were distributed out of them 65(86.67%) were received.

Table 2: Gender wise response rate of Respondents

Gender wise response rate	Respondents	Percentage
Male	41	63.08
Female	24	36.92
Other	0	0.00

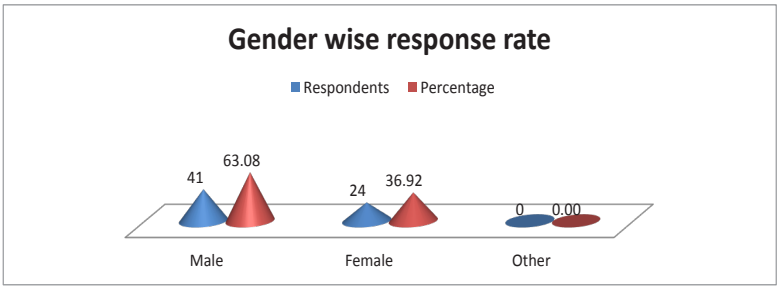

Figure 2

Table 2 and figure 2 shows the gender wise response rate of respondents. The result reveals that 63.08% male respondents were response while 36.92% female respondents were response their opinion. Overall, the results revel that male respondents are dominants in this study.

Table 3: Place of access library resources by LIS students

Place of access resources	Response	Percentage
Library	31	47.69
At home	2	3.08
Campus	26	40.00
Departmental library	5	7.69
Other	1	1.54

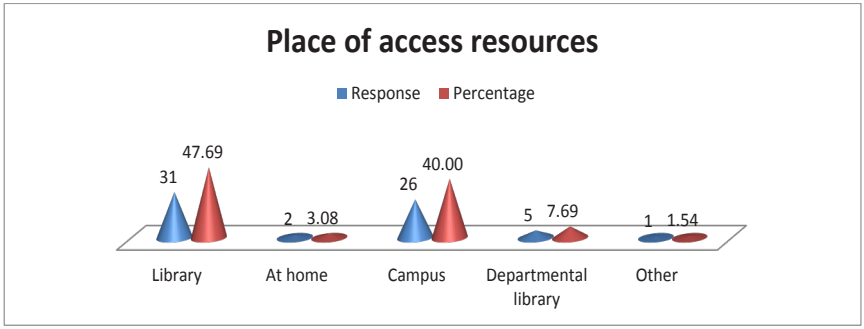

Figure 3

Table 3 and figure 3 shows the place of access resources. The results revels that 47.69% respondents were usage resources in library, followed by 40% respondents in campus; 7.69% respondents from departmental library; 3.08% respondents from at home and 1.54% respondents were access resources to other places.

Table 4: Resources usage by LIS students

Resources usage by respondents	Response	Percentage
Books	27	41.54
Periodical	15	23.08
E-books	11	16.92
E- journals	6	9.23
Databases	4	6.15
Thesis and Dissertation	2	3.08

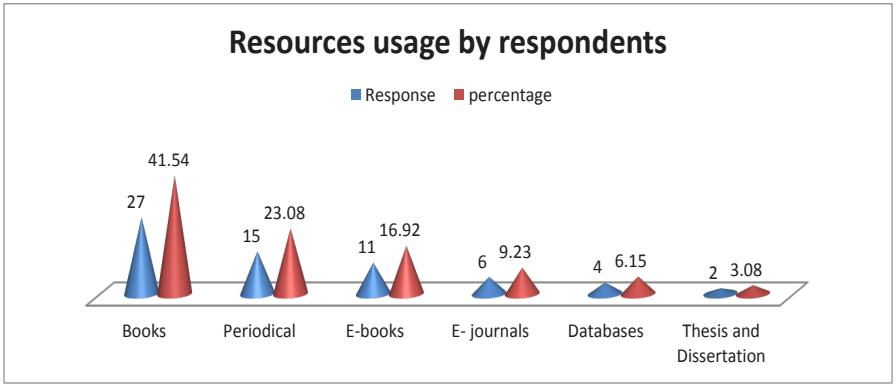

Figure 4

The above table shows the resources usage by users of library. The table.4 and figure .4 reveals that 41.54% respondents were usage books reading materials, followed by 23.08% respondents were usage periodical;16.92% usage of e- books; 9.23% usage e-journals; 6.15% usage databases; 3.08% usage thesis and dissertation of library resources.

Table 5: Purpose of using reading materials

Purpose of usage reading materials	Response	Percentage
To complete assignment	23	35.38
To keep to updated knowledge	21	32.31
To research purpose	1	1.54
For career development	5	7.69
To prepare for examination	16	24.62

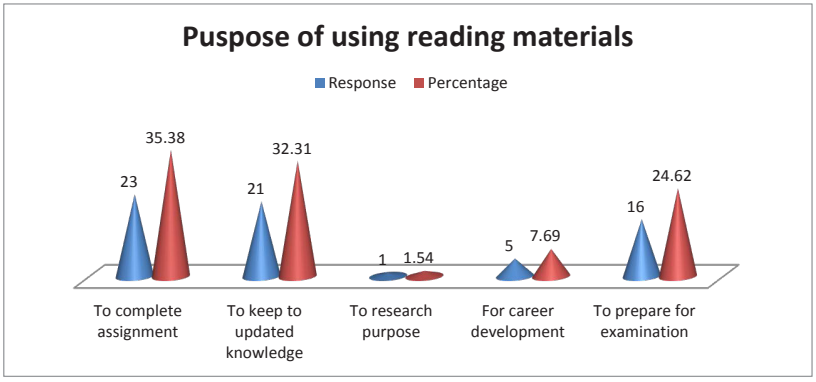

Figure 5

Table. 5 and figure.5 shows the purpose of using library resources. The result reveals that 35.38% respondents were using library resources for complete assignment, followed by 32.31% respondents were using for keeping to update knowledge; 1.54% respondents were using for research purpose; 7.69% respondents were using for career development; 24.61% respondents were using preparation for examination.

Table 6: Problems faced by respondents while using reading materials

Problems faced by respondents	Response	Percentage
Absence of up-to-date books	17	26.15
Lack of E- resources	23	35.38
Fewer availability of reading materials concerned to subject	10	15.38
Physical condition of reading materials is not well	8	12.31
Availability of more reading materials	7	10.77

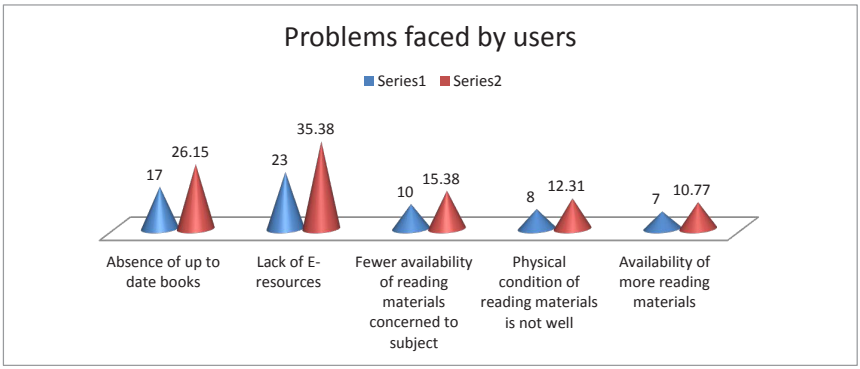

Figure 6

Table.6 and Figure.6 shows the problems faced by users while using of reading material. The above table and figure reveals that 26.15% users were agree about to absence of updated books in library, followed by 35.38% users were agree about to lack of e- resources; 15.38% users were agree about to fewer availability of reading materials in library; 12.31% users were agree about to not availability of well physical structure of reading meterials;10.77% users are agree about to availability of more reading materials in library.

Conclusion

Due to adoption of information communication technology in library and changing user's information needs, there are origin numbers of challenges for library that how to fulfill the user's information needs and enhance their satisfaction. There are needs of present hour assessing the user's information taste, needs and their expectation. The findings of the study, majority of the users are using reading materials in the library and most of them are using books as dominant rather than e-books and other allied materials. The study reveals that most of the users are using information resources for complete the assignment. Fewer students are using reading materials for research work. On the basis of primary data, the result reveals that most of the library users are faced problems in library concerned to absence of updated reading materials.

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Awareness of the Navodaya Vidyalaya Libraries: A Survey of JNV Barnala School Library

Malavika Kishore

Abstract

The purpose of this article is to create awareness about the functioning of libraries in residential Co-Educational schools –Navodaya Vidyalayas. Various activities are conducted in the library to support the educational system- enhancing the mental and physical growth of a student. Librarians have to update themselves with digital resources which makes their Job more challenging as they have to provide the students with the emerging trends of digital library resources, e-content, blog, and open education resources are helpful for the education of students. All the Navodaya libraries have been fully automated with the help of e-Granthalaya Ver 4.0. An online survey about the library services conducted shows that the students are well satisfied with the services provided though there are many areas to be improved. Librarians of NVS schools are working in this regard and updating their library though they have to face few limitations.

Keywords: *School Library, e-Granthalaya, Navodaya schools, Digital resources*

Introduction

The school system forms the foundation of any child's educational, moral and ethical values. The foundation should be strong to make any child succeed in their careers, achieving goals, being responsible citizens, and serving society. Navodaya Vidyalayas have been set up to bring out the most from the talented rural children and are doing very well by producing responsible citizens for the society. Libraries play an important role in imparting proper knowledge, education, and information to the students timely. This article has been written to create an awareness about the functioning of these JNV Libraries.

Objectives of Survey

1. to create awareness about the functioning of the Navodaya Schools**.**
2. to understand the management of JNV Libraries
3. to analyze the services provided by JNV libraries
4. to understand how the JNV libraries are working at par with the teaching-learning process
5. to understand the programs undertaken by these libraries for providing quality education to the students.
6. to study how the library shifted from a traditional to digital one
7. to understand the working of eG4.0 version software.

Navodaya Vidyalaya Samiti

Jawahar Navodaya Vidyalaya was set up under the Navodaya Vidyalaya scheme following the national policy of education 1986. Residential schools (co-educational) were planned to bring out the best of rural talent. A need was felt to allow the children in rural areas with special talent and aptitude by providing good quality education comparable to the urban children.

This system was initiated as an experiment and today it is providing education in all states (except Tamil Nadu) and all districts of India to talented rural children. quality education in a co-educational and residential school system was the vision of the Samiti. [1http://navodaya.gov.in/]

Objectives

The main objective to set up these schools was to educate all children irrespective of social-economic background. this could only be achieved when

1. education is provided free of cost
2. schools are set up in a rural background as a rural population have less access to education
3. medium of conversation is in mother tongue or Hindi language
4. girls and boys are given equal opportunity for studying

The above-mentioned features are achieved by providing quality education- knowledge of subjects, language learning, music, art, sports, etc. The concept of Gurukul was implemented in the campus and was set up far away from the city area where all the students and staff resided in a homely family environment. the campus comprises of separate hostels for girls and boys, residence quarters for staff and academic building, mess with dining hall, playground.

Job Role of Librarian

Libraries of Navodaya schools have only one staff library. It's a one-man show handling all library activities. Being a residential co-ed school, various other tasks are also supplemented on teaching staff- teachers and librarians. This makes the librarian a multi-tasking staff due to which sometimes the single-handed library works take a back seat. Automation of libraries and data entry of books in software is also added along with other duties. There is no promotion channel for librarians at the school level in India. Many librarians are working very hard in their respective schools adhering to the tasks of the library, additional school works, and also automation of the library. Librarians are well qualified with graduate or postgraduate degrees in library science. Also, they are given training/ orientation courses for professional upliftment from time to time.

Literature Survey

Sardar & Banerjee (2015) have discussed in detail the functioning of the school library in the Navodaya school system. Jagtar Singh (2009) discussed the status of school library development in India. Lipika Dutta (2016) made a detailed study about the school library services of Dibrugarh and Jorhat district. Panda and Chakra arty (2021) focused on the implementation of cloud-enabledSaaS Services in library automation as a government initiative in India.

Chakrabarti and Sardar (2016) evaluated the user-based study in five JNV Libraries of West Bengal.Issac and Nirmala assessed the collection adequacy of Kendriya Vidyalayas of the Chennai Region.

About JNV Dhilwan Barnala, Punjab

It was established on 6th Dec 2007 amid agricultural farms. The beautiful campus is far away from the crowd which includes the academic block, staff residence quarters, students' dormitories (separately for girls and boys), playground, dining hall, various labs, etc.

About Navodaya Library

All Navodaya schools have a library housing a collection of books, magazines, periodicals, newspapers, and few audio-visual materials. It comprises a single room housing around 40 chairs and 4-6 tables for students of a class of 40 students; along with a librarian's table, chair, newspaper stands, and magazine stand. The collection of the library grows every year

with the purchase of new books. The budget for purchasing books is one lac per annum (may change according to annual budget allocation). Students and staff of the Vidyalaya have access to the library which is planned according to the prospective academic planner by the Samiti. The initiative has been taken by the samite for automation of library holdings and working of the library i.e. online circulation through barcoding of books. It has been done with the help of NIC software e-Granthalaya. Initially, library holdings were updated in the eg3 version but now the holdings had been uploaded in the cloud through the eg4.0 version; which is very helpful and easy to handle. Proper backup was required to be kept in the eg3.0 version or else there were chances of losing the data if windows were corrupted or any issue in the system. But in the cloud version, there is no such issue that makes the task easy. [2]

About The Jnv Barnala Library

The library is situated in the academic block with a size of 890 sq. ft area. It has a collection of around 4500 books, 15 magazines, and 20 newspapers.

It provides a friendly learning environment to the students and staff members and also provides educational support in the teaching-learning process based on regular library classes taken for each class from classes 6-12. During the library class, students utilize the time in:

- leisure reading
- reading newspaper and magazines
- Issue/ return of books
- reading of reference books
- library activities

They also participate in library activities like:

- book review writing
- quiz contest
- scrapbook making
- visiting book exhibition
- making of book jackets/ book cards
- display of new arrivals
- collage making
- quotation writing
- newspaper clippings collection

Figure A: Visit by eminent educationist

Students make use of the library when they participate in various competitions like speech, debate, declamations, essay writing, storytelling sessions, poem writing, etc.

Figure B: Book exhibition by publisher

Career corner is maintained to guide the students with proper career options and also how to choose streams and colleges and universities for higher studies. Workshops are also organized for students to create awareness about careers and other related topics. Guidance related to career, personality development, skill development, life skills, organized and mental health is provided to the students regularly.

Figure C: Workshop on career development

Figure D: different school students participated in the workshop

E-Granthalaya

It is a digital platform developed by the National Informatics Center (NIC), Ministry of Electronics and Information Technology, Government of India for an ICT solution with integrated library management software and also digital library module, cloud hosting environment, and a library portal (OPAC).

It is useful to transform traditional libraries into e-library with digital library services which include automation of in-house activities of libraries, digital library integration, and provide various online member services using a single-window system. EG4.0 is the latest cloud-based version that is used by many Government Institutions which also provide centralized databases. Charge of Rs 21,275/- from each library opting to use eg4 in NIC cloud as one-time payment for 5 years paid to NICSI towards hosting, maintenance, and helpdesk support.[3]

The cluster of JNV in eg4:

JNV libraries have been divided into two clusters in the eg4 version which helps to fully automate the library. It is used for the automation and networking of the JNV library in the country. It is maintained by NIC, Govt. of India. JNV libraries have been added in the eg4.0 platform in two clusters-clusters 1 and 2 with 301 libraries in each cluster. [4]

The digital platform of JNV Barnala Library displays the No. of titles:4054; No. of copies of books: 4116 and No. of members: 245 in cluster 2 of JNV Libraries.

The library is fully automated with the eG 4.0 version software of NIC. Online circulation is also done with barcoding books. It is a small library that is growing slowly in its collection.

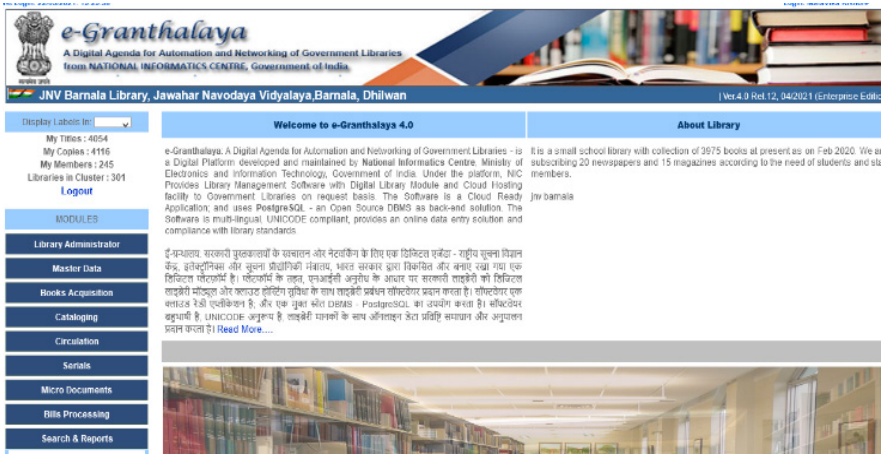

Figure E: e-Granthalaya of JNV Barnala Library

Recently Library and Information Science had been introduced as a skill subject in class XI in which 20 students were enrolled.

The Covid-19 pandemic had affected the educational sector very badly in which the education of the students had been hampered. Library Blog was created to fill the gap between the students and information. The library blog provides the latest information, e-resources, study materials, and all related websites that are required for students.

Its purpose was to create a common platform through the information that could be conveyed to the students in a reliable manner.

This is the library blog of JNV Barnala, Punjab which was created and maintained by the Librarian. Students are provided with e-content, important websites, and digital resources through this platform. Any important information that is to be shared with students is uploaded timely. Pictures and

videos of the Participation of students in various activities are also uploaded to the blog.

The link for the library blog:

https://jnvbarnalalibrary.blogspot.com/

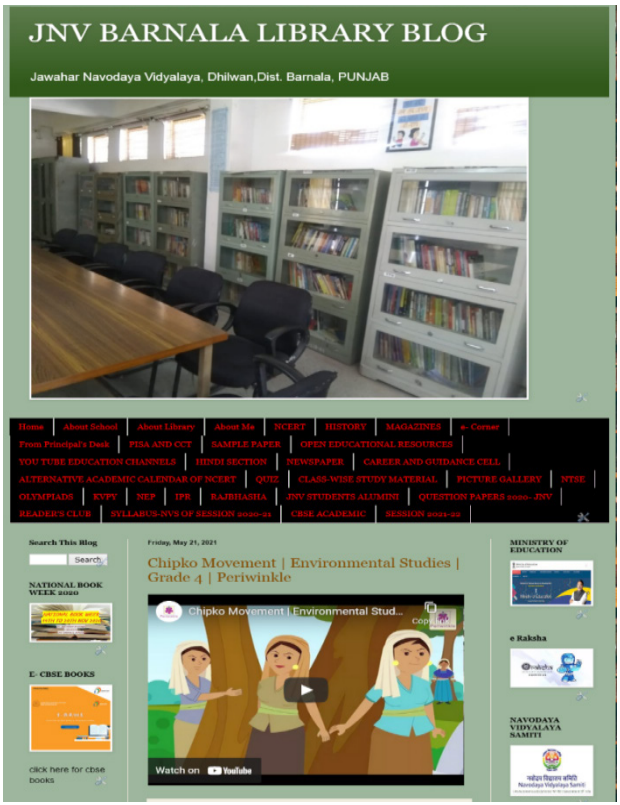
JNV BARNALA LIBRARY BLOG
Jawahar Navodaya Vidyalaya, Dhilwan,Dist. Barnala, PUNJAB
Home | About School | About Library | About Me | NCERT | HISTORY | MAGAZINES | e- Corner
From Principal's Desk | PISA AND CCT | SAMPLE PAPER | OPEN EDUCATIONAL RESOURCES
YOU TUBE EDUCATION CHANNELS | HINDI SECTION | NEWSPAPER | CAREER AND GUIDANCE CELL
ALTERNATIVE ACADEMIC CALENDAR OF NCERT | QUIZ | CLASS-WISE STUDY MATERIAL | PICTURE GALLERY | NTSE
OLYMPIADS | KVPY | NEP | IPR | RAJBHASHA | JNV STUDENTS ALUMINI | QUESTION PAPERS 2020- JNV
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Figure F: The front page of JNV Barnala Library Blog

The Study

An online survey was conducted to study the awareness of library services of JNV Barnala. A questionnaire was made in Google form which consisted of a total of 11 questions excluding name, class, and gender. It was circulated through Whatsapp Class group to students of class 9-12 only. Staff members were not included in this survey.

Scope and Limitations

The scope of the study is limited to only one library of Navodaya schools. The study was done about the awareness of the library services.

Methodology

The study was conducted by an online survey of questionnaires through Google form which was circulated to the students of class 9-12 through Whatsapp class group. Questions included information about the purpose of visiting the library, the purpose of seeking information, various library activities in which the students participated, information related to the library blog.

Data Analysis and Interpretation

Data had been analyzed on the basis of responses received from the students through an online survey in Google form. The figures listed below had been taken from the Google form responses.

Figure G indicates that out of a total of 104 responses, 71.2% of respondents are female students and 28.8% are male students. Generally, the female students are more sensitive in participating in the survey.

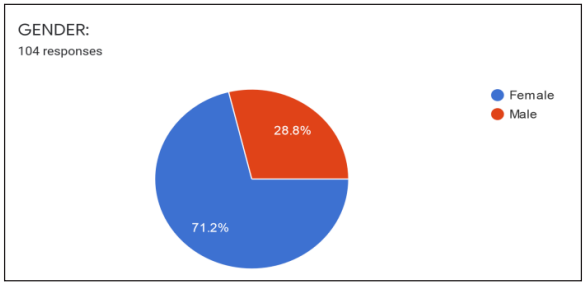

Figure G: A gender study

Figure 1 shows the interest of students in visiting the library. 93.3% of students liked visiting the library and 6.7% of students were not sure about it. Also, it depicts that there is no such student who is not willing to go to the library.

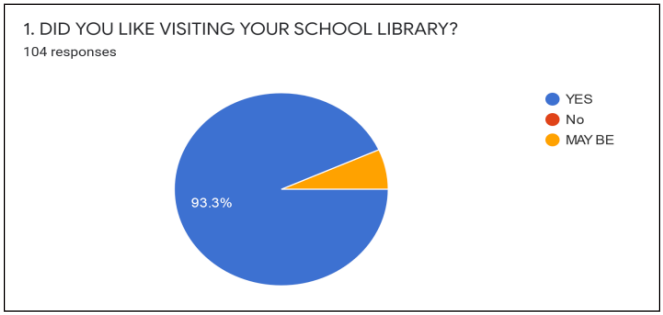

Figure 1: Visiting of library

Figure 2 explains the purpose of visiting the library during their library class. All the classes visit the library at least twice a week and during this time they are involved in fulfilling their purposes. It depicts that 50% of students are interested in reading newspapers and magazines. 40.4% of students come to study in the library, 31.7% are interested in the new arrivals in the library. 29.8% of students come to borrow books from the library. 23.1% of students are interested in reading the reference books during the library class and 5.8% browse the shelves to quench their thirst for reading.

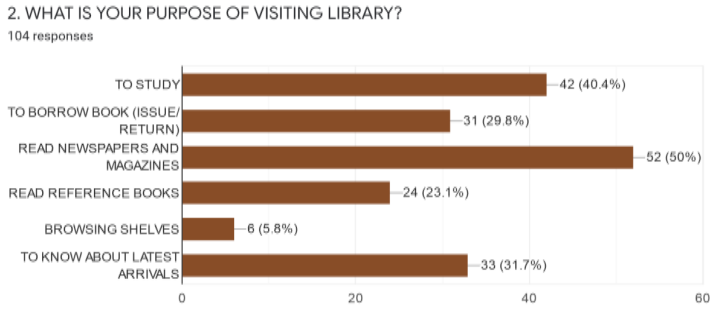

Figure 2: Purpose of visiting the library

Figure 3 clarifies the purpose of seeking information by the students. It shows the interest in gaining knowledge is maximum among the students. 51.9% are interested in gaining knowledge and 35.6% want to keep themselves updated. 34.6% of students seek information for additional study which is other than their subject study. Career development is very important for the students at this stage and 31.7% are interested in this field. 30.8% of students are interested in leisure reading to relax their mind and 20.2% of students are interested in literature reading. Most students are interested in reading the literature in their mother tongue (Punjabi). 13.5% of students assist themselves in subject practical works.

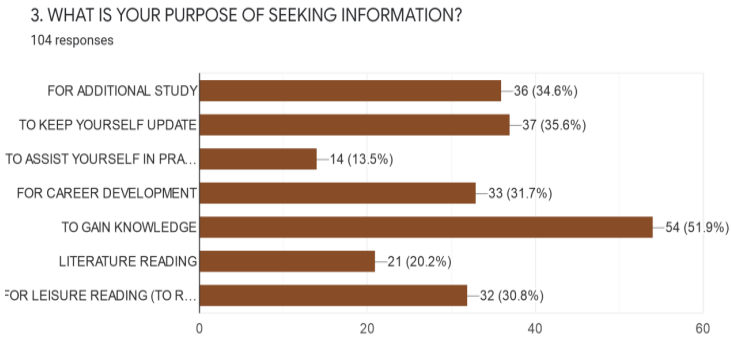

Figure 3: Purpose of seeking information

Figure 4 reviews the activities in which students are interested in participating which indicates that 56.7% of students are interested in quiz contests. Offline and online quiz contests are held for students on various topics like environment quiz, current affairs, etc. E-certificates are given to the students for online quiz participation. 26% of students are interested in writing book reviews and also in story writing and poem writing. 19.2% of students are interested in making book jackets, 13.5% in storytelling sessions, and 10.6% in book exhibitions. 9.6% of students are interested in quotation writing and bookmark making and 24% are interested in other activities conducted in the library.

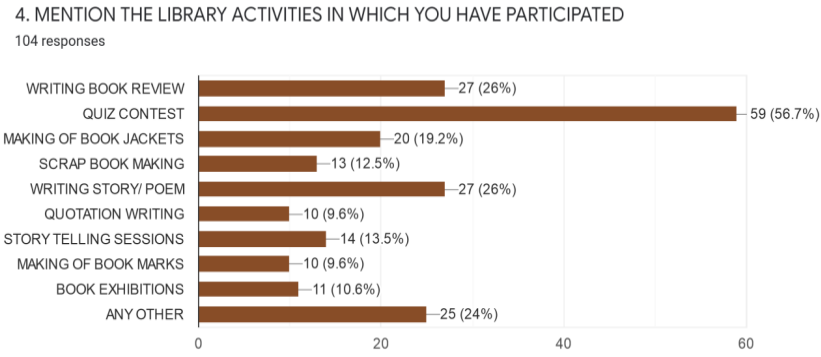

Figure 4: Participation in library activities

Figure 5 depicts that out of 104 responses 79.8% of students had visited the library blog and 15.4% of students were not sure about visiting the blog. 4.8% of students have not visited the library blog.

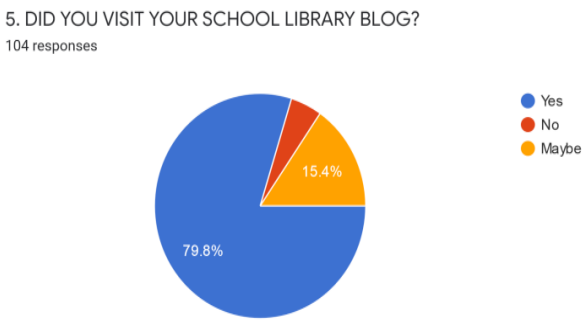

Figure 5: Visit of the school library blog

Figure 6 shows that 92.3% of students agree that the library blog is important and beneficial for them. 7.7% of students are not sure about its importance.

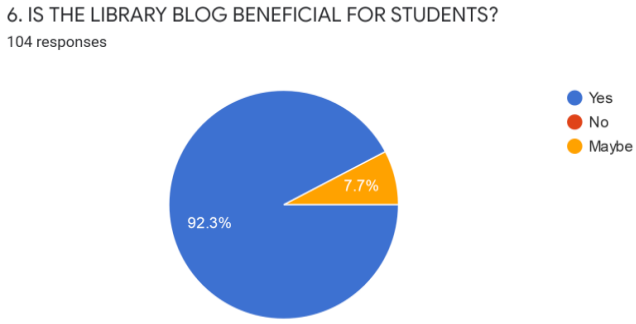

Figure 6: Importance of the library blog

Figure 7 shows the popularity of various sections in the blog. There are many pages and sections in the blog in which the most popular are the recent uploads (35.6%), career corner (33.7%), and quiz section (30.8%). 26.9% of students are interested in the student's activity section which includes pictures and videos of students' participation in various activities. The PISA and CCT section are viewed by 23.1% of students and the e-newspaper and magazines section is viewed by 22.1% of students. 20.2% of students view the syllabus and question papers section followed by 16.3 % of students visit the sections of pages related to subjects. Open Education resources have been viewed by 8.7% of students and 7.7% of students visited the e-corner. Only 4.8% of students viewed the SWAYAM/ CBSE portals and 3.8% visited the Manodarpan site. 9.6% of students visited other websites uploaded in the blog and 13.5% of students visited other sections of the library blog.

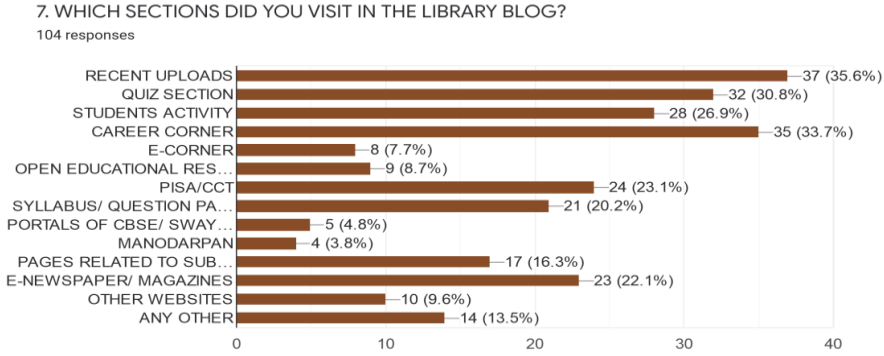

Figure 7: Visit of library blog sections

Figure 8 depicts the rating of the library services. 55.8% of students rated the services to be excellent, 28.8% rated as very good and 15.4% rated the services as good.

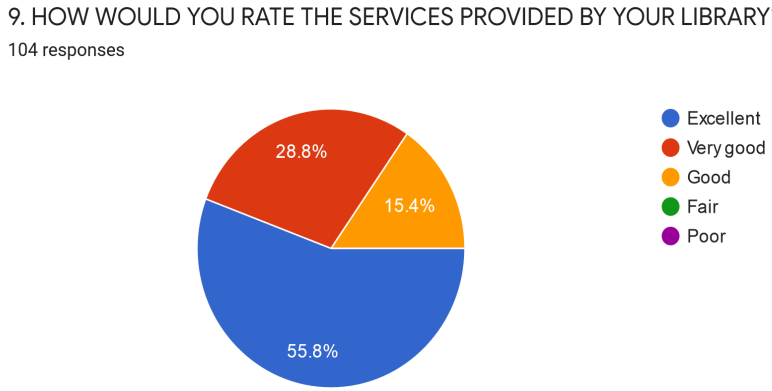

Figure 8: Rating of library services

Figure 10 explains the problems faced by students while seeking information. There is no such problem faced by the students and all students did not respond to this question. 79 students out of 104 have responded. Only one student had written about book services slowly.

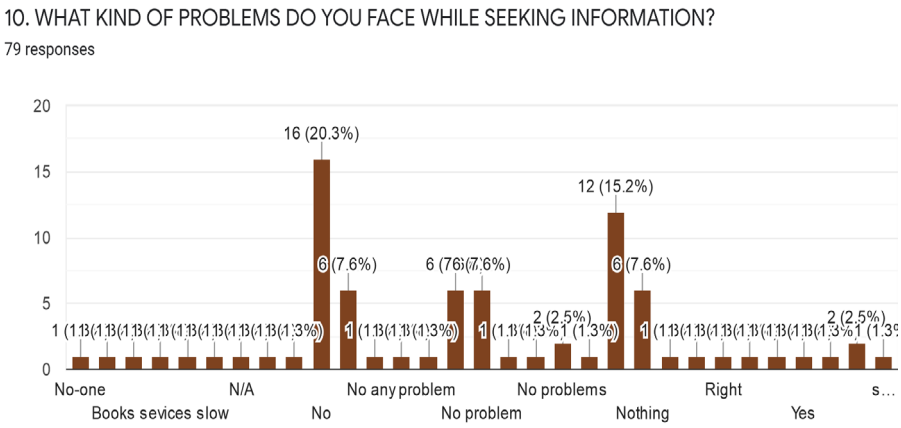

Figure 10: Problems faced by students

Suggestions were also asked of the students for improving the services in which most of the students seemed to be satisfied. Few suggestions were to provide e-newspaper and books. Students also require information related to career prospects. These services are already provided to the students but still, they will be improved.

Recommendations

1. library resources available should be latest providing up-to-date information
2. provision of purchasing e-books/ e-resources may be made by the authorities
3. as it is a small library, there is a provision of adding more digital resources
4. more awareness is to be created for using the library blog
5. Awareness is also required in using the Government portals like SWAYAM, Manodarpan.
6. reference service facility must be given the importance
7. the students' orientation program should be held every year to make the students familiar with the library and its resources
8. JNVs can build their network of libraries within a particular region. For example: Network of JNV Libraries under Chandigarh Region. It will help in sharing of resources online and avoid duplicity of titles.

Challenges Ahead

The functioning of the JNV libraries has been traditional but the automation of the libraries has improved the functioning of libraries. Librarians have to face the challenges of creating awareness among the students regarding the concept of e-library, digital library resources, open educational resources, library blog, etc. Librarians themselves have to update themselves in all these fields to effectively serve the school community.

Conclusion

School libraries (Government or Public) in India are not given much concern as they should be given. Most of the school libraries are functioning with only one staff- one librarian which is not sufficient for the smooth functioning of libraries. Moreover, they are also given additional work to do. Library associations in India must work for the upliftment of school libraries and librarians must also have a promotional channel. Librarians in JNV schools are working in a residential co-educational environment which enhances the bonding between the staff and students. This bonding strengthens the mental and physical development of a student and provides good citizens to society.

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Use of E-Resources by Faculty Members and Research Scholars: A Case Study of Pt. Ravishankar Shukla University, Raipur

Surendra Kumar Sahu & Dr. Sonal Singh

Abstract

This study investigates the usage of E-resources by faculty members and research scholars of Pt. Ravishankar Shukla University, Raipur. A personally designed structured questionnaire was used for data collection. The data were collected through a personally designed structured questionnaire. The researcher personally distributed the questionnaire to 150 respondents. The findings of study highlights that the respondents are using e-resources for learning, updating subject knowledge, and for research purposes. Limited access to computers and lack of training is considered as barriers in access to e-resources. The common benefits of e-resources are easy to search, up-to-date, easy to share and link to other resources.

Keywords: *E-resources, Collaborative learning, ICT, social media*

Introduction

The information world has expanded dramatically over the last decade mainly due to developments in information technology. The speed of communication is moving at a tremendous rate due to ICT innovations and social media facility. The introduction of computer and application of optical technology for library and information activities have drastically changed the ways of information handling. Electronic resource is valuable tools for study, collaborative learning and research activities due to faster and timely delivery of information. They provide different types of search options for precise

and pinpointed information access. They offer facility to access information resources at any time (24x7) and location. There are various types of e-resources which are available on the Internet include full-text journals, newspapers, indexing and abstracting databases, e-books, dictionaries, encyclopedias, reports, online databases, digital images, institutional repository, industry profiles, information gateways, CD-ROM (audio/video/text) etc.

Collaborative learning and research activities can be taken to a different orbit on social media. Today, an institute or a university can easily find institutions across geographies and initiate dialogue to other institutions for collaborative learning. On social media the overhead cost of online collaboration is so low that even individual teachers or students themselves can take initiative and explore co-creation and collaborative learning (Sahu, 2014).

Pt. Ravishankar Shukla University

Pt. Ravishankar Shukla University is Chhattisgarh's largest and oldest institution of higher education, founded in 1964, and named after the first chief minister of erstwhile Madhya Pradesh. The University has a sprawling campus in the western part of the capital of Chhattisgarh, Raipur. There are Twenty-Nine teaching departments in the University.

Attracted by the opportunity to study and conduct advanced research with renowned professors and fellow scholars. There are 5000 students enrolled for variety of courses offered by the departments who are steered under the guidance of more than 100 faculty members. Jurisdiction of RSU covers entire central and southern part of Chhattisgarh. There are 180 educational institutions affiliated to the University (Pt. Ravishankar Shukla University, 2021).

Literature Review

Information is a nervous system for the teacher and researcher, without the information they cannot teach and generate new information in an academic institute. The information and communication technology tools have changed the mode of communication and availability of information in a digital environment (Bellary and Surve, 2019). Electronic resources have become an indispensable component of every library's collection. They facilitate self-learning, fast and easy availability of information and research output without any geographical barrier (Siwach and Malik, 2018). E-resources or "Electronic resources" can be defined as the resources available on the internet which are a godown of data and information on different subjects and topics (Mittal and Bala, 2013). There is no doubt that e-resources are contributing a lot towards research, development, and higher education. These resources have converted into knowledge disseminating center. These resources are being accessed by

user community at a very fast pace (Kumar, Palaniappan and Duraisekar, 2018). Bala and Lal (2016) the findings show that the impact of e-resources is noticeable on the library users in pattern of using and accessing information. It has given a free space to the users to develop lifelong learning skills as well as the independence of using the resources without any hitch. Habiba and Chowdhury (2012) found that a majority of the users use e-resources for the research and learning purpose. They acknowledged that the electronic sources have improved their skills of searching and they feel more comfortable with the e-form of resources (Bala and Lal, 2016).

Though the use of online database is not to the expected extent, but the user awareness programmes and library seminars may increase the use of these databases (Bala and Lal, 2016). The main problem to use the available e-resources was inadequate infrastructure to meet the requirements of users. Secondly training programs should also be revised as per requirements (Sharma, 2009). It is also found that busy schedule in the institute prevents the effective and efficient use of the e-resources (Bellary and Surve, 2019).

Continuous organization of training programs for the faulty members and the students has become the need of an Hour which will be beneficial for them to know about different search interface, latest changes of the journals site and develop sophisticated searching and retrieval skills or techniques; need to increase the bandwidth of internet connection. Before and after the electronic resources' subscription, survey on users should be done at regular interval (Habiba and Chowdhury, 2012).

Objectives

The study was conducted to analyse the uses and effectiveness of e-resources provided by Pt. Ravishankar Shukla University for its faculty members and research scholars. Specific objectives of the study are:

1. To identify the awareness of E-resources among the faculties and research scholars;
2. To determine the purpose and frequency of using the electronic resources available in the library.
3. To find out benefits of e-resources over conventional sources of information.
4. To examine the level of satisfaction of the users on e-resources; and
5. To determine the effectiveness of e-resources on the research work.

Research Methodology

In this study, questionnaire method was used for data collection. A survey was conducted in March 2021. The target population of this study was faculty

members and research scholars from all departments of Pt. Ravishankar Shukla University, Raipur. A questionnaire containing 10 closed ended questions was personally distributed to 150 faculty members and research scholars. Out of total sample, 112 participants successfully answered with response rate of 74.6%. This study attempts to examine the awareness of e-resources among faculties and research scholars, purposes of using them and barriers faced by them. The data were analyzed and presented in graphs and tables.

Data analysis and Results

Awareness of E-resources

Fig. 1 depicts the awareness of e-resources among faculty members and research scholars. There are considerable differences between levels of awareness of different type of e-resources. It reports that all the respondents are well aware with Websites (84%). Over 60% respondents are aware of E-newspapers and e-journals followed by CD-ROM Database 53%, E-book 48% and Institutional Repository 46%. Less than 40% respondents are aware of Online Database and only 22% are aware of Information Gateways.

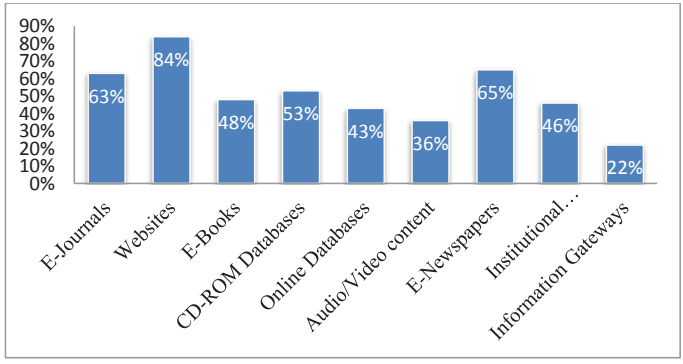

Figure 1: Distribution of awareness of e-resources

Note: the percentage is in rounding off. (n= 112)

Usage of E-resources by faculties and researchers

The trend of using e-resources by faculties and researchers illustrated in figure 2. It shows that 77% respondents used Website, 65% E-newspaper, 61% E-journals, 43% online databases and 40% CD-Rom databases to access e-resources. E-books searched by 38% researchers and faculty members while Audio/video content by 33%. One fourth of total go for institutional repository and a few respondents (9%) used information gateways.

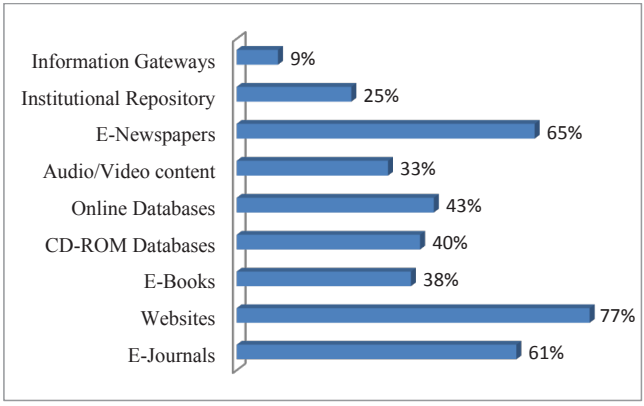

Figure 2: Usage of E-Resources

Note: the percentage is in rounding off. (n= 112)

Time spent on e-resources

Fig. 3 represents the time spent by faculties and researchers on e-resources. It is observe that 45% of respondents spend one to two hours, 35% access e-resources less than one hour, and 9% uses occasionally. Only 11% of respondents use e-resources more than two hours.

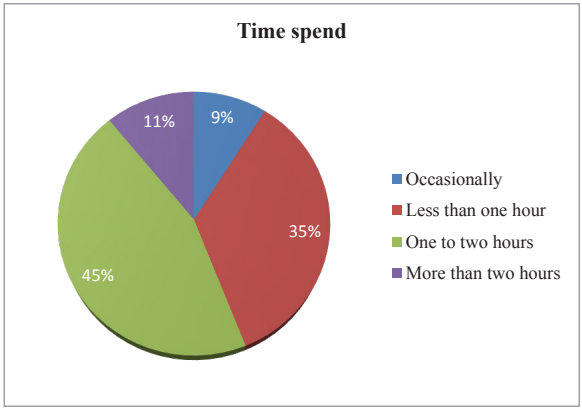

Figure 3: Time spent on e-resources

Note: the percentage is in rounding off. (n= 112)

Purpose of using the E-resources

Respondents are asked to point out their purpose of using e-resources. Figure 4 illustrates that over 70% respondents used for update subject

knowledge followed by learning (70%). It is found that respondents (53%) use e-resources for research purpose and teaching (42%).

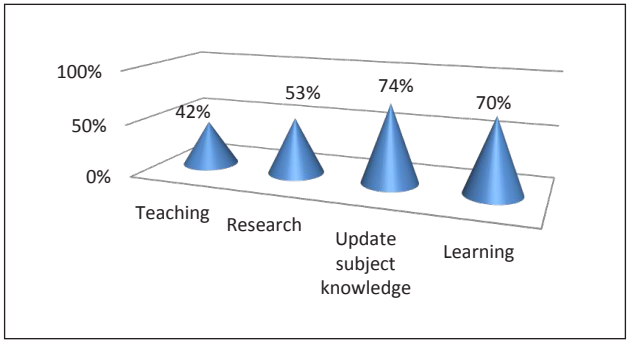

Figure 4: Purpose of Using Electronic Resources

Note: the percentage is in rounding off. (n= 112)

Benefits of e-resources over conventional sources

E-resources are rise above conventional sources of information with their efficient features. Figure 5 depicts that quick accessible major benefit for respondents (86%) followed by easy to search (78%), up-to-date (58%) and easy to share (49%). Link to other resources is the least considered benefit by respondents.

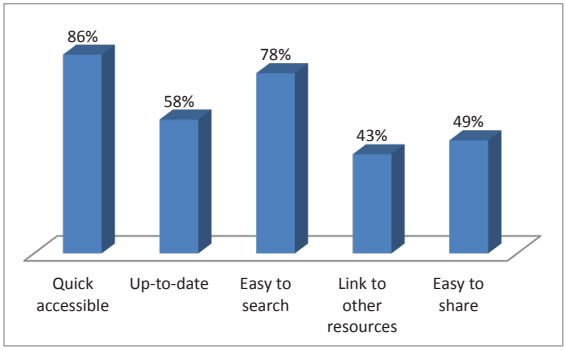

Figure 5: Benefits of e-resources over conventional sources

Note: the percentage is in rounding off. (n= 112)

Problems in Using Electronic Resources

Fig. 6 explains problems faced in using e-resources by respondents, the most common problem is limited access to computers (76%) followed by slow download speed (70%). It is examined that 68% of respondents faced problem

in finding relevant information while limited number of available title is concern of 57%. Lack of training is considered as problem of more than 50% of respondents.

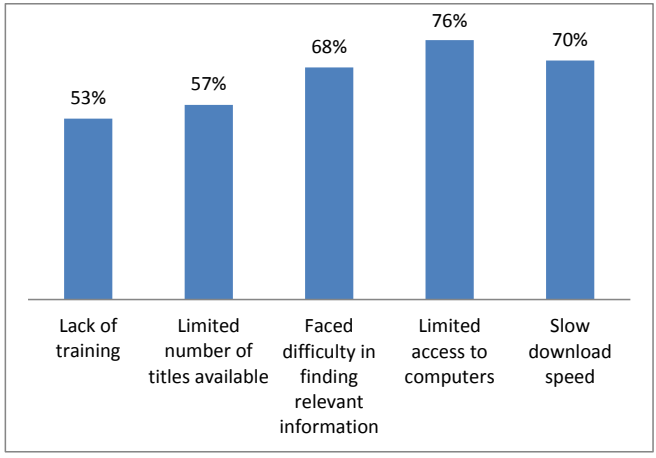

Figure 6: Problems in Using Electronic Resources

Note: the percentage is in rounding off. (n= 112)

User Satisfaction

Fig. 7 illustrates user satisfaction level with IT interface and available e-resources. It is observed that 7% of respondents are highly satisfied with available IT facilities and e-resources followed by 'above average' (14%), 'average' (50%) and 'below average' (21%). A few respondents (8%) are not satisfied.

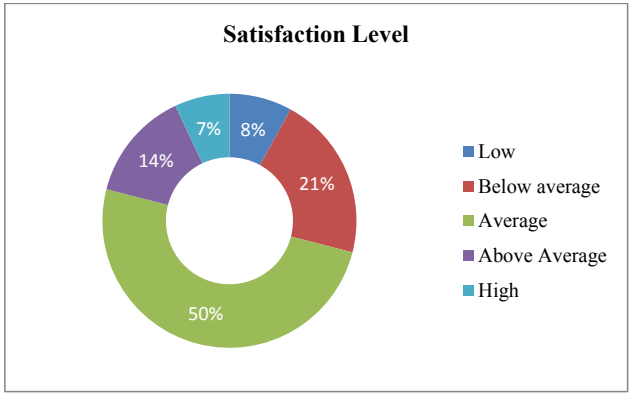

Figure 7: User Satisfaction with existing IT Infrastructures and e-resources

Note: the percentage is in rounding off. (n= 112)

Level of Effectiveness

Effectiveness of e-resources on academic and research work is presented in figure 8. The result reveals that majority of the respondents (86%) agreed that e-resources are efficient for academic learning and fast research development.

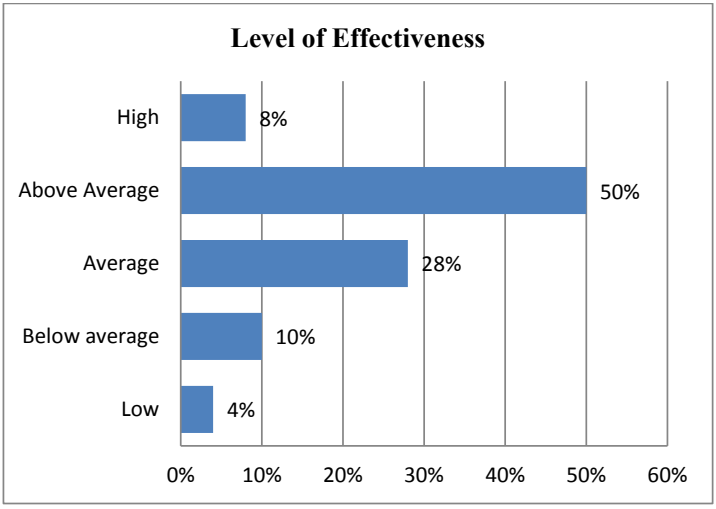

Figure 8: Effectiveness of e-resources on academic and research work

Note: the percentage is in rounding off. (n= 112)

Conclusion

This study finds that faculty members and research scholars of Pt. Ravisankar Shukla University are well aware with e-resources. Websites, e-newspaper, and e-journals are most commonly used e-resources to access information. More than 50% faculty members and research scholars used e-resources for update subject knowledge, learning and research activities. E-resources get the upper hand with their features as quick accessible, easy to search, up-to-date, easy to share and link to other resources. The common difficulties faced in using e-resources by respondents, are limited access to computers, slow download speed, limited number of available title and lack of training. It is found that most (86%) of respondents agreed that e-resources are essential for effective academic learning and fast research development.

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Accessibility on Websites in Libraries: New Hope for Visually Impaired Persons

Vinay Shanker Mahajan & Madhu Bharti

Abstract

In this century, it is important for libraries to provide library services to all users without discrimination. It contains The Education Library serves all users, regardless of their disability. They expand accessibility Meet the needs of all library users. The internet has become an important part of our lives. Because it is so integrated into our lives before seeing a doctor, first look for symptoms of your health problem. Estimated 285 million people there are visual impairments around the world. Visually impaired people also browse websites through the media and to be able to access it. This is a challenge for website designers, as there are many types of visual flaws. Some can you are blind while others have color blindness. This type of user can not only access the website, but also issues and Designer responsibility.

Keywords: *Library Provision, Students with Disabilities, University Libraries*

Introduction

With the spread of various web contents and mobile technologies, Computers are no longer seen as independent technology objects, but as integrated tools that support our daily lives. Activity. The ubiquity of these environments creates opportunities for people to communicate between multiple environments. Computing device at the same time. These trends have provided an opportunity for the Web to evolve into one. An evolving software platform. The main idea behind this approach is that people are also actively involved. Digital content on the web via various web and mobile applications and platforms on the device. All of them Development leads to new ways for

people to shape, share, manage and work in their daily lives. The different accessibility of these solutions directly affects their use by different groups of users. That is A special challenge for a group of users with special needs. One such user in this group is the visual community. People with disabilities who are generally marginalized. One of their challenges is the lack of access to various web content. Promote daily activities. This community is very diverse, for example in terms of the level of disability. Additional challenges to meet your needs. One way to better understand your needs is to identify different companies. The level of need in the decision. In addition, by considering various modality of user interaction, Optimization techniques can reduce the problem of visually impaired users accessing web content. Inspired by In light of these challenges and research trends, this article reports on efforts to address Internet access issues. Visually impaired. Efforts will be made to understand the core requirements and provide an initial solution that can be used below. Allow this marginalized group access to web content. Do design activities and middleware Development by technology.

Library Websites

Library websites and catalog printing must be fully human accessible People with disabilities who combine magnifying functions and screen readers with synthetic audio or braille displays. Definite, A logical design that includes a description of visual or audio material. Make sure you understand the text as well Graphics that do not use color. For more information on accessible websites, see the World Wide Web Consortium. Web Accessibility Initiative http: //www.w3c.org/ and WatchfireWebXact http: //webxact.watchfire.com. You can also please consult the National Library for the blind.

UGC Guidelines

At the meeting on June 13, 2008, the Government of India recommended: "All institutions need to be accessible within a reasonable period of time. For example, two years in college and three years in college. Braille books and audio books are available for the visually impaired. "We also need equipment to provide education. Educational institutions with hearing-impaired students need access to the library. Most central universities and each state have at least one state university. All issues related to people with disabilities, especially human rights, rehabilitation, etc. Circulation of the University Grants Commission (UGC) (NO.F.61 (CCP II), January 9, 2009) Mention:

1. Expand cassette recorder equipment for visually impaired students at the university.
2. Provide facilities for the disabled.
3. Strictly follow the instructions of the PWD Act.

4. Disability studies presentation.
5. Measures for facility accessibility.

UGC also states in its XI Plan guidelines that the building is accessible to people with disabilities and is "barrier-free for people with disabilities." This area must be barrier-free for wheelchairs and other mobility aids.

Indian University Library System

The library is an integral part of the educational institution. school Libraries (secondary and high school), university libraries, and university libraries are all part of the university library system. Our post focuses on accessible services for visually impaired users of Indian university libraries.

Several Academic Libraries in India: Baratihar University, Tamil Nadu started the Talking Book Library. The Rotary Club helped establish it library. The library started operating with 1000 books in the form of CDs and audio cassettes.

University of Jammu: It has opened a resource cell for the visually impaired. Another software, JAWS (Job Access with Speech), was installed to convert hardcopy to voice.

Delhi University: The Braille section of the University of Delhi Library has been expanded for versatility. The Braille library has been added to the central reference library. The center says it's mainly related to Braille production Book production and electronic text editing. Over 400 visually impaired students we are benefiting from these new initiatives. The latest devices such as Braille printers, audio cassettes with reading materials, and reference books are also available. Functions like conversion It is also possible to convert from soft text to voice,

Punjab University: A special area for the visually impaired is set up in the library where you can listen to the contents of the book with special software. The university has also decided to provide free accommodation along with free education in hostels for visually impaired students.

Jawaharlal Nehru University: JNU has also set up a separate section called Helen Keller Unit for visually impaired students. The unit has twenty computers with specialized software like Kurzweil and JAWS etc. These are two screen reading software that allow users to hear text as it appears on 4/8 the screen. The University has also installed an advanced printer which inputs English books and prints it in Braille format.

Lucknow University: The University of Lucknow has established a special library (called the Dr. Manohar Lohia Library) for visually impaired students. The library initially has 50 spaces for the visually impaired. The machine is equipped with conversion software.

University of Calcutta: The University of Calcutta's Central Library, in

collaboration with the National Association of the Blind (NAB), has opened the latest "Digital Braille Library and Audio Recording Workstation" with all modern educational facilities on the second floor of College Street.

The Role of Libraries for the Disabled

As disabled users of libraries and information services, most public libraries are wheelchair accessible. There are no positive policies to help people with disabilities. It should be emphasized that students with disabilities, in particular, need equal access to public and academic libraries. The librarian should contact the coordinator of the disability organization with the required information.

1. The librarian has a special responsibility to recognize the service of persons with disabilities.
2. Use of information technology for users with disabilities.
3. The public library can function as a referral center by building a collection for handicap.
4. Make a list of related websites for people with disabilities to see.
5. Make sure that all children with disabilities have free access to the library.
6. Efforts to establish vocational training facilities in special schools for persons with disabilities.

Creating a Model Library Program for the Disabled

To create an efficient and effective library program for the disabled, the library is up-to-date and aware of the latest developments that can have a serious impact on the service. I am. It is their common responsibility to understand the problems of people with disabilities and promote quality service. Library staff needs to be aware that some people with disabilities may not be able to control their behavior. Therefore, you need to be able to handle difficult situations. You are ready to pay individual attention to understand your strongest mode of communication. Therefore, the following aspects are essential for developing a model library program:

- Training of library staff,
- Development of user support system,
- Provide special services.

Suggestions

An ideal library can do its job by providing the following assistance to people with disabilities:

1. Assists the use of devices such as Braille printers, CCTV readers (25-inch color CCTV), scanners, and the Kurzweil 3000, which is used in combination with a scanner to read scanned text. Zoom OPAC functionality must be available.
2. A copy service for articles or chapters from books. This includes enlarged editions, including computerized printed matter (to the extent copyright restrictions are permitted).
3. Help find materials from trained library staff.
4. Assist in the use of library computers, catalogs, references, microform readers, or other library equipment.
5. Provides the visually impaired with a basic introduction and assistance with assistive technology software such as Read & Write and SuperNova (SuperNova is a screen reader and magnifying glass that helps visually impaired people use Windows applications). We can support students through expansion. Read back the text.
6. Treat reference questions in a friendly way.
7. Assist in printing from your library computer by emailing search results. 5/8
8. Assists in interlibrary loan, document distribution, booking, or filling out search requests.
9. If there are no reference counter employees, the lending service employee will assist within the limits. You can get information assistance by phone or email from the Information Center.
10. Librarians can provide advice on printed and electronic materials in specific subject areas.

Conclusion

As Christensen S (2001) says, library websites are much better than they were a year ago. The accessibility of your website means you are a technical leader.. »The situation is not very advanced in Croatia. For example, the Croatian public library does not have a website that adheres to the most basic W3C guidelines for accessing web content. Making your design accessible is important, and setting up a hub that provides advice on how to make your website accessible can make a difference.

Further research on information retrieval behavior for the visually impaired is needed. Today's libraries provide library materials in accessible formats such as large print and Braille, as well as digital and audio formats, and by cataloging the digital library of these materials on the Worldwide Web, to everyone. We provide services. Make sure your field workstation is ready for the development of visually impaired and other library services.

As the efforts outlined in this article show, much can be done to improve access to information for the visually impaired in the digital age.

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LIS Education in India: Past to Present

Dr. Ashwani Kumar & Sanjay Kumar

Abstract

The article focused on the perception of Library and Information Science Education and Library and Information Science professionals in India. LIS education in India is becoming more omnipresent to the new emerging and developing situations. It is seen that during 1990s the subject of Library and information science increased in popularity with the establishment of some regular as well as distance learning institutes. IGNOU is one of the best distance learning institutes by which this course has become more popular among working and non-working persons. Not only in these days but also in earlier, this course had been known as a professional course by which any could get the job opportunity as per their completion of the degree, diploma etc. in LIS courses. Through this article, an attempt is making to study library education in India in the current scenario.

Introduction

As we all know that libraries and other information Centers are act as an important social organization in the growth and development of modern society. In today's scenario, we all know that LIS education is well established as an important discipline in a large number of universities as well as some institutes who offer this as well-known professional course. On the basis of data, it can say that almost 200 universities and institutes are offering library and Information science programs with various degrees. Many of the universities and institutes are offering master's degree in library and information science; also there are some universities which are offering bachelor's degree program, except these, many of the universities and institutes are offering M.Phil. And Ph.D.'s in library and information science program.

To meet the growing demand for LIS education, the number of distance education programs is growing up in India. To enhance the quality of LIS education the statutory bodies i.e. The Indian Council of Social Science Research, University Grants Commission, and other associated bodies are promoting the LIS research program by awarding various fellowships and scholarships to the scholars at doctoral as well as post-doctoral levels. Apart from that various foundations, councils, and commissions i.e. Raja Rammohun Roy Library Foundation. (RRLF), Calcutta, Indian Councils of Social Science & Research, and National Commission on Science and Technology (NCST), New Delhi, etc. are also providing research grants for non-doctoral research.

Historical Aspect of LIS Education

The beginning of the LIS education had been need-based. The basic need was 'Training of the Librarian'. The Maharaja Sayyaji Rao Gayakwad of the Baroda State was felt that the Librarian should be trained. He invited William Alanson Borden in the year of 1911 to a trained librarian and it was the year when education for library science began. So it can say that more than 100 years that LIS education exists in our country. As per some reports, Mr. John Macfarlane, the first librarian of earlier Imperial Library(now known as National Library of India) at Calcutta during 1901-1906, was started service training in Library. After a few years, a systematic training program was started for the staff of the other libraries. The first training school in library education was started by Mr. William Alanson in 1912 in India. In the year of 1913 Baroda started a five months summer course which was attended by 18 city librarians. The second training course was started in 1915 at the Punjab University, Lahore (now in Pakistan) by A.D. Dickinson. In 1920 Andhra Desha Library Association was started a library training course at Vijayawada. In this period the diploma courses in library and Information Science were offered by only five state universities i.e. Andhra, Banaras, Bombay, Calcutta, and Madras. After the independence of the country, some reputed universities, colleges, and other educational institutes were emerging and felt professionally qualified to manage their libraries. Due to these reasons, a number of library science school was started. With this phenomenon, various Library associations were also started various training courses in the field of Library Science in different places. In this continuity, Dr. S. R. Ranganathan had started a certificate course through Madras Library Association in 1929 which was taken over by the University of Madras after some time and in 1937 this course was converted into a Post-Graduate (PGDLIS) Diploma in Library Science. Later on, it was known as the First Diploma program in Library Science in India. In this developing period of library science, in the year of 1964, University of

Delhi became one of the first university in India who established the full-fledged Department of Library and Information Science and started to admit the student to pursue the Post Graduate Diploma in 1947. This Post Graduate Diploma programme was changed to a Master in Library Science (M.Lib. Sc). During the period between 1956-1959 total, six universities i.e. Aligarh Muslim University, Pune University, Nagpur University and Vikram University, M.S. University of Baroda and Osmania University were established departments in various programs in library science. Besides these courses, the first M.Phil programmes in Library Science were started by the University of Delhi in 1978. During this period many universities, institutes, and other autonomous bodies played a very significant role in the development of Library and Information Science system at various place in the country.

LIS Education in Present Scenario

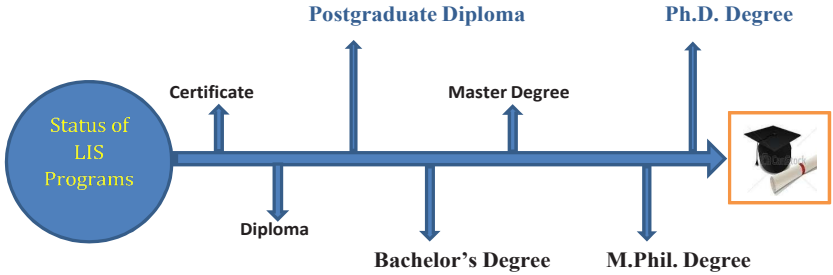
Presently in Indian scenario, the Library and Information Science education is provided by more than 182 universities and institutes in all over India. In the respect of LIS education various program are offered at different level i.e. Bachelor of Library and Information Science (BLIS) is offered by 132 universities and institutes, Master of Library and Information Science (MLIS) by 136 universities and institutes, M.Phil in Library and Information Science by 21 universities and approx. 93 universities and institutes are offering Ph.D. program in Library and Information Science. Apart from that there are some library associations and institutes i.e. National Institute of Science Communication and Information Resources (NISCAIR) New Delhi, Documentation Research and Training Centre (DRTC), Bangalore, Tata Institute of Social Science are also offering Associateship courses for LIS education, which are equivalent to the MLIS degree. Very recently this course has been introduced at the school level. The Central Board of Secondary Education (CBSE) is offering this Programme at school level in the senior secondary classes.

Level of LIS Education

The LIS courses offered number of universities, institutes, autonomous bodies, library associations at different levels. These programmes are running in regular mode as well as through correspondence or distance mode. The LIS courses are available in India presently these are as follows:

1. Certificate in Library and Information Science (C.Lib.Sc)
2. Diploma in Library and Information Science
3. B.Lib.I.Sc./BLIS (Bachelor Degree in Library and Information Science)
4. M.Lib.I.Sc./MLIS (Master Degree in Library and Information Science)

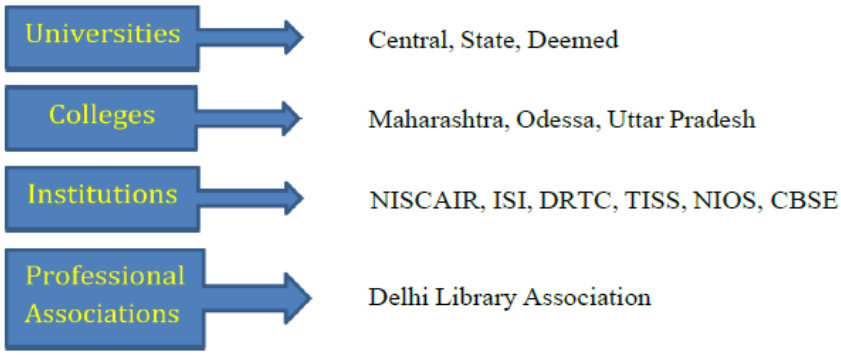
5. PGDLAN (Post Graduate Diploma in Library Automation and Networking)
6. M.Phil. (Master of Philosophy) in Library and Information Science
7. Ph.D. (Doctor of Philosophy) in Library and Information Science



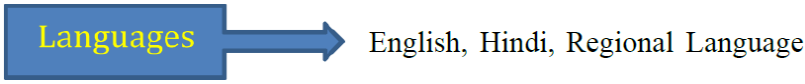
Status of LIS Education

There are some programmes which are offered by different institutions at their various levels. There has been growth in different universities, institutes, autonomous bodies that are these types of programmes. The central universities, state universities and deemed universities which are proliferating and offering LIS programmes. Due to proliferation and growing numbers, it can estimate that around 15000 graduate who complete their program and entered in the job market. So it is towards very positive and encouraging. People are taking much interest to join LIS courses because this course has not required any specific background in the concerned discipline. That's, why this course has also a wide area of disciplines such as Arts, Humanities, Sciences, Social Science, even engineers are taking up these programmes. Because of the increasing demands of the skills, competencies that people come towards this course. There are following the status of LIS programmes in different aspects:

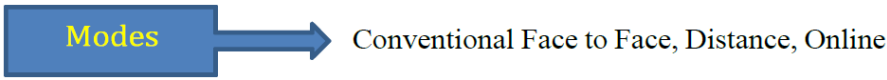
Programme offering Institutions



Programmes offered in different languages



Modes of offered Programmes



Job Opportunities as per LIS Professional Qualification

In the competitive scenario, Library and Information, science has become an eminent course to provide job to the students at various level. LIS educations provide a lot of job opportunity to the student as per the completion of the different LIS course. Due to the limited tenure of the various LIS course, it makesavailable freedom to the students that, on any level of the completion of the course, they may go for the job.The following various levels which show different types of job opportunity accordingly.

Qualification wise Job Opportunity in LIS Education in India.

Sr. No.	Level of LIS Courses	Tenure	The Post may be apply
1	Certificate in LIS	6 Months to 1 Year	Library Attendant Library Assistant MTS Library Book Lifter
2	Diploma in LIS	One Year	Cataloguer Classifier Book Binder
3	B.Lib.I.Sc./BLIS	One Year	Semi Professional Assistant Technical Assistant Junior Librarian Attendant Librarian in KVS/NVS Cataloguer
4	M.Lib.I.Sc./MLIS	One Year	Professional Assistant Senior Library Assistant Librarian in Sr. Secondary Schools
5	M.Lib.I.Sc.+NET	One Year+	Assistant Professor Assistant Librarian College Librarian Documentation Officer Information Scientist

Sr. No.	Level of LIS Courses	Tenure	The Post may be apply
6	M.Lib.I.Sc.+NET+Ph.D	Eight Years' Experience in Concerned Post	Associate Professor Deputy Librarian College Librarian (Selection Grade) Senior Documentation Officer Senior Information Scientist
7	M.Lib.I.Sc.+NET+Ph.D. + 13 Year Experience in Concerned Post	Thirteen Years' Experience in Concerned Post	Professor University Librarian Director of National Institutes Library

Role of Government, Statutory Body and LIS Associations

In the enhancement and betterment of LIS education, the role of government may be very significant but unfortunately, it is not satisfactory. To promote LIS education and getting job opportunities for LIS professionals with the associated course, the government should role effectively. If the government takes action seriously in this area, definitely opportunities for employment will increase.

As a statutory body, University Grant Commission is playing a very significant role in designingthe curriculum and preparing the necessary guidelines for the developing LIS education in India. In the contextof ICT enable scenario, its role is becoming more challenging. Besides it, the various professional bodies like Indian Library Association (ILA) and concerned State Library Associations can make pressure on the Indian Government and other concerned state government to formulate an effective national commission on Libraries and Information Science. These associations may organize useful short-term courses, conferences/seminars workshops etc. so that the library professionals may up-to-date and enhance their knowledge effectively. Similarly other institutes such as Indian National Scientific Documentation Centre(INSDOC), National Information System for Science and Technology (NISSAT), National Social ScienceDocumentation Centre (NASSDOC), National Institute of Science communication and Information Resources (NISCAIR) and Defense Scientific Information & Documentation Centre (DESIDOC) can play a very significant role in this context.

Conclusion

In the digital era, it has become more necessary that LIS education and training should be provided ICT based and electronic environment. So that LIS professionals may very efficient to work in this digital environment. The professional education and training of the LIS professionals should be based on the ICTresources, gadgets and services, by which professional

may be very expert in the use of such as in e-mail, browsing, searching, accessing journals, managing databases, CDs and DVDs, the creation of websites anduses of various application software. The university and other institutes, who are offering Library education in various programs, those institutes have to look forward and make sure to available advantages, as well as opportunities, lie ahead of us. To face the challenges of the twenty-first century, the proper and efficient use of Information and Communication Technology for LIS professionals as well as students has become very crucial. In order to make perfect library professional, libraries education and training must be provided along the proper way. It is need to present hour.

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Role of Libraries in Institutional Ranking – A Preview

Dr. Sheeba Menon

Abstract

Academic libraries were designed earlier as a place for collection, accessing and preservation of print collections. With the emergence and usage of information technology, libraries have a new perspective and understanding to fulfill its potential by adding to the institution's academic mission. Within any academic institution, a reinvigorated and dynamic learning resource is always required. So, a library can be the center piece for intellectual community as well as for scholars. A library is considered to be a centralized place where information technology merges with the traditional knowledge. It supports today's social and educational patterns of learning, teaching and research. Thus, the libraries are learning laboratories with a concord that fulfills the needs of the current and the future academic community. The Assessment, ranking and managing systems help higher education system, faculty and librarians in managing, recording, maintaining data and to generate reports. The Assessment and management systems are beneficial in documentation of progressive and managing good learning outcome. The major role of libraries in educational institutions is to promote research activities and knowledge among students. The role of library involves in assessment of research and also is an important part of institution's strategic planning progress. Assessment and ranking pattern in all the countries consists of the composition of both qualitative and quantitative criteria. The qualitative and quantitative criteria focus on the research assessment, the citations and impact factors respectively. Lastly, the reform required for scholarly publishing, open access, the number of repositories and other library related are still considered to be in second order as compared to academics.

Keywords: *Library, Institution, ranking*

Introduction

According to Jackson, 2017, way back in 1994, historian Shelby Foote said "a University is a set of buildings which has library at its centre". The quality of library and its networking has evolved substantially when the University library statistics was first collected and published more than a hundred years ago. The Gerould statistics was utilized to provide metrics for comparing academic libraries in relation to collection, size, growth, expenditures, acquisitions, number of working staff and their salaries. The Association of research libraries (ARL) and its investment index has been publishing annual reports regarding ranking of libraries in higher education which is based on the total expenditures that include salaries, wages, other types of collections and number of working staff.

According to Kumar et al, 2020, Academic libraries are responsible for promoting inclusion, access to information and equality for learning communities. This helps in building a knowledge society. Moreover, academic libraries are indispensable to institutional programmes in building research driven environments, strengthening learning outcomes and supporting information literacy and lifelong learning. Academic library as a space of learning has been considered for promoting educational equality and measuring the satisfaction of users in critical service areas. Aligned with institution, academic libraries lead in the production of scientific knowledge. Academic libraries are considered to be a transition from traditional information to various library users. Libraries have the capability to improve the research impact by over 40% and also help in scoring through related scholarly publications.

Essential functions of academic libraries are (Kumar et al, 2020) –

- Provide information literacy.
- Assist in student attainment.
- Assist in academic success.
- Driving research impact.

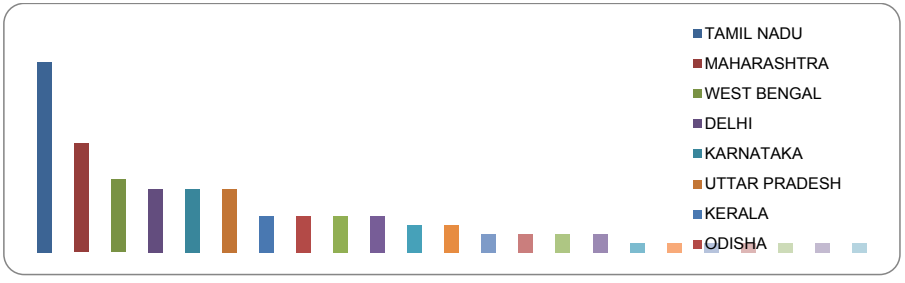

Figure 1: State -wise higher educational institutes in NIRF top100 overall category (Kumar et al, 2020)

Per capita expenditure (Kumar et al, 2020) –

The per capita expenditure is a strong indicator of the financial health of a library. The more per capita, the better is the financial health of the library.

Per capita (p) library expenditure = Library expenditure (EL)

Student strength (SS)

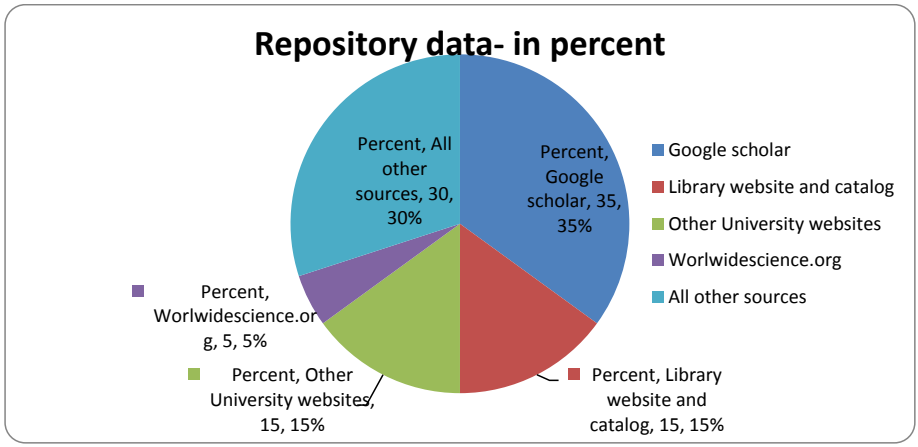
Repository data- in percent
Percent, All other sources, 30, 30%
Percent, Google scholar, 35, 35%
Percent, Worlwidescience.org, 5, 5%
Percent, Other University websites, 15, 15%
Percent, Library website and catalog, 15, 15%
Google scholar
Library website and catalog
Other University websites
Worlwidescience.org
All other sources

Figure 2: Repository data in percent (Tamarkin et al, 2014)

Benefits of libraries (Tamarkin et al, 2014)-

1. **Researchers** – Libraries can improve the understanding on how to communicate the research work. It also helps to have organized scholarly profile and presence. Finally libraries also guide us to navigate into the changing scholarly communication landscape and helps in connecting the pieces of the research lifecycle.
2. **Institution** – Libraries can enhance the profile of an individual and a researcher. This will improve their research and its impact and the reputation of an institution. Thus, libraries help in research funding, faculty evaluation and recruitment.
3. **Future** –Libraries help in digital preservation and long-term retention of special items. Libraries can also store special digital collections like biological image collections, GIS images etc. This also helps in organizing training programs within the University and many outreach programs at regional levels. Libraries also promote good practices and also maintain services and initiatives related to research data management (RDM). Libraries can also help to evolve an article, video, data, software methods, other types of media to a package. This thus, increases the importance of reputation management.

Accreditation and ranking (Jackson, 2017)

Accreditation has been one of the definitive means for assessing a university and quality of programs conducted by them in many parts of the world. The library researchers have focused on the information, literacy, the outcome and measures required to follow the accreditation guidelines. American Library Association has defined information literacy as an outcome which helps students to recognize which type of information is required and can help them in locating, evaluating by using the needed information effectively.

University/College rankings (Jackson, 2017)

The role of libraries in any type of university going for rankings is not considered. The global ranking systems do not include libraries in their analyses and neither any measure for including libraries has been taken. Further, during the ranking process, the quality of library is explored. But, the primary indicators (number and type of literature, daily issues, frequent staff visit to library, number of daily student visit to library) are least touched.

Student surveys (Jackson, 2017)

The surveys related to the library experiences of students fall into two categories: -

- The first category includes with the direct questions where the library quality and its use wholly or some part of library and its services is considered.
- The second focuses on the questions related to the measures and the behavior of students which are connected to the outcome of information literacy. The questionnaires may vary regarding between those who are clear about the usage of library resources for the proper development of skills related to information literacy and those students who just inquire about the outcomes of information literacy without even identifying a specific context in connection with library.

Conclusion

In case of any type of ranking systems in academic institutions and in research institutes the role and importance of academic libraries should be considered. Moreover, libraries play a vital role in driving research impact and creating a global work force for competitive and employable candidates. It is unthinkable without academic libraries in higher educational institutions. Therefore, the ranking system and higher education should support the quality of academic libraries, which is considered central in the ranking scenario. The National funding agencies should change the minimum allocation of finance to academic libraries. It is a challenge for libraries to differentiate the accessibility to print and electronic resources. Libraries are considered to be the 'heart of any institution', that help in providing resource material to teaching, learning

and researchers. Libraries through Information literacy programs and digital repositories have extended the user's end. Lastly, Higher education should support libraries and should consider them as an essential component of the academic infrastructure.

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About the Author…

Dr. Sheeba Menon has 25 years of academic experience. She has 10 years of research experience with 21 publications. She has published her research papers in UGC and Scopus listed journals. She completed two projects under GUJCOST and UGC. She has also published chapters under various subjects. Moreover, she has presented eighteen papers at state, national and international level seminars and conferences.

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Role of Library in Enhancing Institution's Ranking/Grading

Dr. Subhash Chandra

Introduction

Every institution is aimed to attain its objectives efficiently, effectively, economically and timely. Ranking is basically a judgment of worth, assessing the value of organization to the people for whom it is meant. A ranking/grading is a relationship between a set of items such that, for any two items, the first is either "ranked higher than", "ranked lower than" or "ranked equal to" the second.[1] University ranking was an invention of US in the beginning of the 20th century. The ranking of institutions was first time published in the USA by US News and World Report in 1983.

The issue of ranking/grading of institutions has been the hotly and much debated topic in recent decades. The ranking of higher educational institutions depend on different criteria or combinations of set of factors. These criteria/factors may be teacher/student ratio, research excellence, specialization expertise, campus placement, historical reputation, industrial linkage, etc. Generally ranking mostly conducted, evaluated and published by magazines, newspapers, governments and websites. Thus ranking/grading of an institution creates competition between the institutions all over the world.

As we know that the libraries play major role in the research activities and academic growth of teachers as well as students. In Indian higher education, the academic community which is publishing/generating quality research papers in UGC care listed/peer reviewed journals in a particular field may be considered as light house of the institution in the field. Olivia Crosby described

libraries as "Information experts in the information age". Specific duties may be vary depending on the size and type of the library. Academic libraries are one of the largest cost centers in higher education system.

Academic libraries not only facilitate student learning and success, but they also demonstrate their value through evidence like impact assessments, metrics and outreach activites[2]. The then President of India Shri Pranab Mukherjee has told in the BRICS Summit (2015) "Being Visitor to 114 institutions of higher learning, I had been regularly emphasizing on how to improve rankings. I refused to believe that not a single university could come up to the standard required for being in the top two hundred universities in the international rankings". While talking on the quality education the President said: "the quality of education has a direct co-relation with inclusive growth and development. Emerging economies facing the challenges of meeting the developmental aspirations of their citizens must build an educational system comparable to the best in the world".

Thus, ranking/grading of institution has become a benchmark in the globalize world of higher education.

Mechanism for Ranking

There are a number of mechanisms available that rank the institutes. Among them the most popular and are commonly referred to are Shanghai Jiao Tong Academic Rankings of World Universities (ARWU), QS World Ranking of Universities (QS World) and the Times Higher Education World University Rankings (THES). The regional ranking of institutions is a new phenomenon. Both QS World and THES have started recently bringing out the ranking of the Asian institutes. THES, in addition, also brings out the BRICS ranking.

In India, the media has started the process of ranking the institutions. A popular magazine India Today published a survey on best institutions in the year 1997. In 2004, ORG-MARG identified the top ten institutes in the field of arts, science, commerce, law, engineering and medicine streams. Business World magazine ranks business schools of the country. NAAC assesses the universities and colleges and awards grade them for three years. It also computes scores on several parameters which could have been used to rank universities.

National Institutional Ranking Framework

The process of NIRF was started in the year 2014 to suggest a reliable, transparent and authentic ranking/grading system for the Indian institutions. The same was approved by the Ministry of Human Resource and Development, Govt. of India and launched by the then HRD Minister on 29th September 2015.

NIRF uses a methodology on the basis of five parameters to rank institutions across the country. Each parameter has been given a score of hundred by the sub-parameters of these parameters. These five parameters[3] are as under:-

1. *Teaching, Learning & Resources (TLR)* → This parameter is related to the core activities of any institution. It is also further categorized into four sub-parameters.
2. *Research and Professional Practice (RP)* → This parameter is related to the quality of research publication. It is also categorized into four sub-parameters.
3. *Graduation Outcomes (GO)* → This parameter forms the ultimate test of effectiveness of the teaching/learning process. It is also further categorized into two sub-parameters.
4. *Outreach and Inclusivity (OI)* → This parameter related to the representation of women and socially challenged persons. It is also categorized into five sub-parameters.
5. *Perception (PR)* → This parameter gives a significant importance to the perception of the institution by its stakeholder's viz. general public including students, parents and employers.

The above parameters are for overall ranking. There is also disciplines (Engineering, Management, Pharmacy, Architecture, Law, Medical, Dental, etc.) wise methodology for ranking.

At present the registration for India Ranking 2022 is open and any institute may apply before the extended last date i.e. 10th Dec., 2021.

National Assessment and Accreditation Council

NAAC was established in the year 1994 as an autonomous institution of the University Grants Commission with its head quarter in Bengaluru. The accreditation framework of NAAC is based on five core values i.e. contributing to national development, fostering global competencies among students, inculcating a value system among students, promoting the use of technology and quest for excellence. The NAAC is carrying out the process of quality assessment accreditation of higher educational institutions since two decades successfully[4].

Data Requirement for Self-Study Report (SSR)

The institute who desirous the NAAC visit in their campus, a detailed self study report must be submitted on-line to the NAAC office. The format of the Self-Study Report contains six sub-sections, viz., Executive Summary, Profile of the University, Extended Profile of the University, Quality Indicator Framework (QIF), Evaluative Report of the Departments, and Data Templates/ Documents (Quantitative Metrics).

As per NAAC Manual the information related to the library must be given strictly in following format[5] only.

Key Indicator – 1. Library as a Learning Resource (20)

Metric No.		Weightage
1.1 Q_1M	***Library is automated using Integrated Library Management System (ILMS) and has digitisation facility*** Describe the implementation of the automation of the Library and the digitization facility available and used in maximum of 500 words **File Description** • Upload any additional information • Paste link for additional information	4
1.2. Q_nM	Institution has subscription for e-Library resources Library has regular subscription for the following 1. e-journals 2. e-books 3. e-ShodhSindhu 4. Shodhganga 5. Databases **Options:** A. Any 4 or all of the above B. Any 3 of the above C. Any 2 of the above D. Any 1 of the above **File Description** • Upload any additional information • Details of subscriptions like e-journals, e-ShodhSindhu, Shodhganga Membership etc., (Data Template)	6
1.3 Q_nM	***Average annual expenditure for purchase of books/e-books and subscription to journals/e-journals during the last five years (INR in Lakhs)*** 1.3.1.: Annual expenditure for purchase of books and journals year wise during the last five years (INR in lakhs) **Year** **INR in lakhs** Data Requirement for last five years: (As per Data Template) Expenditure on the purchase of books Expenditure on the Purchase of journals in i^{th} year Year of expenditure: Formula: $\frac{1}{5} \times \sum_{i=1}^{5} Expdi$ Where: **ExPd**$_i$ =Expenditure in rupees on purchase of books and journals in i^{th} year **File Description (Upload)** • Any additional information • Audited statements of accounts Details of annual expenditure for purchase of books and journals during the last five years (Data Template as of 4.2.2)	5

1.4 Q_nM	***Percentage per day usage of library by teachers and students (foot falls and login data for online access) (Data for the latest completed academic year)*** 1.4.1: Number of teachers and students using library per day over last one year Data Requirements: • Upload last page of accession register details • Per day login/online users of library • Number of users using library through e-access • Number of physical users accessing library **Formula:** $\frac{\text{Number of teachers and students using library per day}}{\text{Total number of teachers and students}} \times \mathbf{100}$ **File Description (Upload)** Any additional information Details of library usage by teachers and students (Library accession register, online accession details to be provided as supporting documents)	5

Role of Library

The library plays an important role in supplementing classroom teaching and it is the librarian who disseminates the precise information contained in the documents to its users in efficient and effective manner. Thus, the library contributes the institute's learning and research activities in various ways which are directly and indirectly help to develop the ranking/grading.

Following are the major areas which may be covered by each library of the institute.

1. Each library must maintain their statistics of the user, visitor, resources use, daily transaction of the study materials, purchasing materials, etc.
2. Bibliometrics is a major part of the library. It is a quantitative evaluation metrics of publication patterns to knowing institution's outcome.
3. The infrastructure of the library is very important to the users. Library should have good ICT infrastructure (automation, digitization, on-line catalogue and other electronic services) to provide efficient services.
4. A library cannot survive without collection which is most important aspect. The collection should be rich and user friendly.
5. The library's reading room must be open at least twelve hours so that users may use the library before and after teaching period also.
6. There should be an advisory committee for enhancing services, development and technologies.

Summing up

It is general opinion that if somebody wants to know about status of any academic institution then he should visit the library. If library is well managed and staffed then institute will be better than others. In the present situation national ranking/grading of all academic institutions is necessity to increase competitiveness and quality to bring Indian higher educational institutes at par with global institutes.

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Use of Library Management Software in Uttarakhand State University: A Case Study

Rahul Sah, Hema Adhikari & Dr. Yugal Chandra Joshi

Abstract

Library Management Software is a computer-based system that manages the catalogue of a library. This helps to keep the records of whole transactions of the books available in the library. Library Management Software is very easy to use and fulfils all the requirements of a library. The present study concentrates on two types of Software that is commercial Software and open-source Software. Library Management software is available in both modes, i.e., Open Source or Commercial Software. The results reveal that opensource software is more user friendly than commercial library software in terms of KOHA have free license Software that can be downloaded via the Internet, Works on LINUX Platform which free OS, MARC 21 Format supports Software, KOHA is a web run Library management system (ILS) whose SQL (MySQL preferred) database can be used in the backend, Z39.50 server, SRU module, OPAC Module, Circulation module, and Report Generator Module, etc.

Keyword: *Open Source Library Software and Commercial Library Software.*

Introduction

Library management software (LMS) supports the organization and management of books in libraries. It keeps track of the books that have been checked out and returned to the library. Library management software maintained the database of both existing books and new books in the library. A librarian can keep track of books more easily with the help of library management software. With the use of library management software, a librarian can check the status of any book at any time.

A library management system is a piece of software that keeps track of the library's records. It comprises information such as the number of books available in the library, the number of books issued, the number of books returned or renewed, and late fine charge records, among other things. Library Management Systems (LMS) is software that assists in the maintenance of a database that is used to enter new books and track books borrowed by members and their due dates. It also relieves the librarian's manual record-keeping burden. The librarian can use a library management system to keep track of library materials more efficiently, saving time. It is also simple for the librarian to oversee the process of allocating and paying for books. Students and librarians can use a library management system to keep track of the availability of all books in a library at all times.

Main Features of Library Management Software

1. A simple method for adding new books to the system
2. Keep track of all the details about a book, such as a title, author, and publisher.
3. Checking in and out is simple.
4. It is an easy-to-use software
5. Keep track of the different categories in just a single click
6. Sort the books into categories based on their topics.
7. Easy to maintain the database
8. It is inexpensive.

Importance of Library Management Software

1. A library management system is the most effective and user-friendly system for managing all of the processes that occur in a library.
2. This system will eliminate all manual labor, allowing the entire process to be managed with only a few clicks and edits.
3. There will be no headaches or doubts about safely keeping data and afterward searching the records of any individual.
4. Any book seeker can rent a book by signing in with their information and returning it on the due date.
5. The personnel can additionally benefit from various additional authorizations and privileges.
6. Only one person is necessary to oversee the entire system, without any chance of errors/ mistakes.

Advantage of LMS

1. It reduces laborious paperwork and provides accurate information about books, journals, and other resources that are stored in the library management software.
2. The librarian could update materials in the library, as well as control book availability and arrival statistics.
3. It saves time and effort for humans.
4. The consumer may quickly search and locate books using library management software.

A library exists to serve the needs of the users. In this context, different types of information, sources are provided by the library. So, this study is concentrated on "Use of Library Management Software in Uttarakhand State University: A case study."In Uttarakhand, there are eleven university libraries; out of these, we are confining our study to two universities, i.e., G. B. Pant library, DSB Campus Kumaun University Nainital and Central Library, Government Medical College, Haldwani. Under our cogitation, we cover the study of commercial Library Management Software in G. B. Pant Library under the DSB Campus, Kumaun University, Nainital and open-Source Library Management software in the central library, Government medical college Haldwani, under the Hemwati Nandan Bahuguna Medical Education University, Dehradun. The questionnaire was prepared for justifying the study's objective about different Library Management Software and uses of Software, i.e., Data entry of books, periodicals, news paper, donated books and services of circulation, acquisition, etc. The questionnaires are framed for the librarian/staff to collect information about various aspects of Library Management software.

G. B. Pant Library, D. S. B. Campus, Kumaon University, Nainital

G.B. Pant Library has been known for its facilities provided to its user's services. Some key services are as follows:

- Reprography Facility
- InterLibrary Loan Services
- Information Deployment and Notification
- Internet Access
- Printout Facility
- User Orientations Program
- Initiatives taken by the library during five years are
- Fully functional reprographic section
- Institutional repository
- Grants for computer purchase

- Extension of stack hall and other renovation work of library
- Fund for library automation
- Installation of RO water system
- Internet section
- Recruitment of Library staff
- Write off of books

Commercial Library Software

The G.B. Pant Library, D.S.B CAMPUS, Kumaun University, runs "Total Library Solution" Library Management Software.

TLS is a Commercial Library Management Software (ILS) used in public, private, and school libraries.

TLSMS

- TLS Stands for Total Library Software developed by M/s Total Library Software Pvt. Ltd. New Delhi.
- Total Library Software System (TLSS) is a powerful database engine designed to serve organizations, institutions, and libraries to manage their contents and data efficiently.
- TLSS has proved to be reliable Software, particularly in large libraries.

Features of TLSS at a Glance

- Integrated, multi-tasking information management software is mainly used by small, medium and large libraries (medical, legal), research institutions, universities, schools, and corporate.
- User-friendly Software as it can be used by masses using Microsoft Office and Windows environment.
- Designed by IT experts and well-qualified librarians, the Software is consistent, versatile, and intuitive.
- It can be operated through a point-and-click navigation system.
- It can maintain a large volume of records and information.
- It has an In-built bar code generation and printing process.
- Can meet bookkeeping-related requirements and subscription-related data. This includes reports, book Issues, returns, magazines, newspaper subscriptions, calculating, fines, and balances of payments due from members.
- It is platform-independent and powered by VB & .Net.

Central Library, Govt. Medical College, Haldwani, Hemwati Nandan Bahuguna Medical Education University, Dehradun

Central Library, Government medical college Haldwani is one of the most prestigious automated and well-equipped libraries in Uttarakhand State.

Government medical college is a special library because it provides efficient information to a specific group of users of medical science. So, for managing all the records and data, we use library software.

The library software used by Central Library, Government Medical College is KOHA, an Open-Source Library Management Software.

Open Sources Library Software

The Central Library, Government Medical College runs KOHA Open-Source Library Management Software. KOHA is an open-source library management system (ILS), used in public, special and school libraries.

KOHA

Koha is free to license Software that can also be downloaded via the Internet. Koha is a web- run library management system (ILS), whose SQL (MySQL preferred) database can be used in the backend and Z39.50 or SRU modules. Numerous data entries can be done under the MySQL database. The interface of Koha is easy and friendly for the users. It has been translated into many languages, which is helpful for the users to understand easily. There are many modules in Koha Library Management-Software.

Features of KOHA at a glance

- Out of sight, elite free/open-source Software
- OS is not dependent on any operating system like Linux, UNIX, and MAC.
- Professional cataloging is supported by MARC 21 and UNIMARC.
- Library–standards-compliant industrial standards and protocols
- Z39.50 server
- Web-based interface
- Customizable web-based circulation system
- Online reservation
- Full catalog, circulation, acquisition, library stock management
- Serial module management
- Print barcode

Review of Literature

Chalukya (2019) explained "free applications for the composition of library computerization." He said that for the digitization and computerization of the library, a lot of money is required. However, open-source Software can reduce this expense of the library. Further, he said open-source Software gives the user freedom to modify the Software. Eventually, commercial Software is monitored by the company.

Khan & Khan (2017) stated about "library automation and digitations through open-source software". He said that library automation and library digitization require more budgets. However, open-source library software can reduce cost comparison to commercial Software. Further, he stated that the open-source Software has a quality regarding source code open. Due to this facility, professionals can customize according to the library's needs.

Kumar & Raghunadha (2014) was objective of their study to know about the "analytical study on knowledge regarding open-source software in technological institutional LIS professionals." The selected various open-source library software, such as Koha, NewGenlib, PhpMyLibrary, OpenBiblio, Avanti, Greenstone Digital Library, DSpace, E-Prints, Fedora, etc. further he stated that open-source Software, are less than commercial Software. There should be aware regarding open-source Software among library professionals.

Pratheepan, Syed & Alex (2013) stated that "Integrated Library Management Systems (ILMS) - Open Source and Commercial Software." He said that the integrated library management system is a computer-based system that manages internal and external resources. The centralized database is used to search the data of many libraries in one place due to the MARC format. Centralized databases provide access to the acquisition, cataloging, and inter-library loans. Compared LMS systems include Koha, Evergreen, NewGenLib, Libsys, Voyager, and SOUL. Last he suggested that based on the advantages and disadvantages of best-suited system that could be implemented in the University environment.

Reddy & Reddy (2012) stated about "library automation software packages in India: A study of the cataloging modules of Alice for Windows, LibSys, and Virtua."The results show that the small budget library always adopts open-source Software due to the high cost of commercial Software further said that the benefits of open source software could potentially reduce costs; give users more control, and increase software performance but Librarians need to understand the license of open source software and strengthen their hold in Software to increase the usability of open source library software in libraries.

Research Methodology

Our recent study is on the "Use of Library Management Software in Uttarakhand State University: A Case Study" The research methodology followed in our study is the questionnaire method. A Questionnaire is one of the methods of research, which abide a number of questions for collecting data. For this purpose, a structured questionnaire is designed, which contains 40 questions. This questionnaire is distributed among students and staff members of G.B. Pant Library and Central Library Government Medical College, Haldwani. Out of 40 questions, only 20 questions are found fit for data analysis. The present study is conducted using a questionnaire-based Survey method along with observation.

Designing of Questionnaire

The most important aspect of the Questionnaire method is designing the question on which the whole study is based. The present research framed a questionnaire to collect data from faculty and students. Their responses have been collected regarding the use of search engines by G.B Pant Library staff members under the D.S.B Campus, Kumaon University, Nainital. Open-Source Library Management Software in Central Library, Government Medical College, Haldwani under the Hemwati Nandan Bahuguna Medical Education University.

Pilot Study

Before the questionnaire was put into actual operation, a pilot study was conducted to find out weak points, if any. For this purpose, students were selected randomly among the faculty members & student and requested to fill the questionnaire. After the pilot study, relevant modifications were made in the draft of the questionnaire.

Distribution of Questionnaire

The final printed questionnaire was distributed among faculty members & students. All students & faculty members know the relevant information filled. This process takes approximately 20 days to collect data.

Sources of Data

1. Data: it has been collected from two different categories of sources.
2. Internet record: The world growth data about the search engines (in annual reports) have been taken from the Internet.
3. Responses: data were collected through the questionnaire method

Analysis and Presentation of Data

Collected data is now analyzed and presented in tabular form; then, interpretations are drawn based on this analysis, and conclusions are drawn.

This study used the descriptive research method in which the researcher systematically described the background, credentials, features, functionalities, and capabilities of each selected Web Search engine. The faculty members and students also observed those engines and gathered secondary data from journals, research papers, etc.

For evaluation and analysis purposes, the faculty and students applied two co-related methods: information retrieval evaluation Methodology and common features comparison.

Result

After analyzing the data interpretation, the result of our study is that KOHA Open Source Library Management Software is much better than any Commercial Software in many aspects like –

1. KOHA is free to license Software that can be downloaded via the Internet.
2. Works on LINUX Platform that is a free OS.
3. MARC 21 Format supports Software.
4. KOHA is a web run Library management system (ILS) whose SQL (MySQL preferred) database can be used in the backend
5. Z39.50 server
6. SRU module
7. Monitoring System Interface & backend process
8. Member management module like Patron module
9. OPAC Module
10. Circulation module
11. Report Generator Module

So, by comparing all these aspects, we concluded that KOHA open-source library management software is preferable more effective for the users.

Discussion

The objective of our study is to analyze the "Use of Library Management Software in Uttarakhand State University "concerning the mode of education. Therefore, to achieve our objective, we have discussed many facts through the questionnaire method. The conclusion which we draw from the discussion are given below:

1. Most of the users used KOHA Open-source software and observed that it is effective for library users.
2. KOHA Software has MARC21 by default, while commercial Software does not work by default. They need to be customized.
3. In commercial Software, we pay an amount for its services, while KOHA is free of cost.
4. TLSS needs annual maintains charges every year, while compared with KOHA, it does not need any annual maintains charges.

Suggestion

The role of librarians is to monitor changes in the recent trends of technology. We should always adopt new trends in technology

For developing our libraries, the first step is automation. For automation, we can use open-source library software as well as commercial library software. But on comparing we can suggest that the users can easily use open source as it is free of cost and user friendly while commercial library software is expensive and not easy to maintain its annual maintains yearly. Open-source library software comes with a free license, but software information is required for its use. Workshops can also be organized to increase the knowledge of open-source Software. Users of the G. B. Pant Library and Medical college give some suggestions: -

1. The library should use the KIOSK system.
2. More computers are to be installed for OPAC Service and some computers for separate faculty members.
3. More trained staff should be appointed to handle the digital environment to the library.
4. More journals should be entered into library management software.
5. Library resources should be more desirable format according to user needs. E-journals relating to the medical field should be available in the library for faculty members and students of Medical College.
6. Suggestions should be obtained from faculty members and students for improving library services.

Conclusion

The changing trends or growth of information and communication technology, particularly automation, have changed traditional libraries' traditional methods. Recently automation has emerged as the most formidable medium to provide the best services to their users. About library automation, users have to use many Software modules.

The present study observed that most users are not aware of different modules except Circulation Services through library Software. For this purpose, libraries should take initiatives or a step ahead to provide a users orientation program for library members and students. These initiatives can be formal and informal information, literacy programs specific to searching, documents, reservation policies, etc. Library professionals should take a drive to prepare lists of library services for retrieving relevant information. They should also work in union with students to select appropriate software modules to retrieve useful information.

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Content Management System: An Overview

Shashi Rai & Dr. M. P. Singh

Abstract

Content is knowledge created from the editing process and consequently intended via publication for human society. Members of user community can afterward choose keywords to browse for information, which is extracted by the CMS framework and show as the result of query. The Library Content Management program which is basically a Web Content Management System will encourage readers to annotate, interpret, review, and exchange material by digitizing and archiving newspapers, video streaming, and similar content.

Keywords: *Content Management System, History, Component, Criteria for selection of Content Management System*

Introduction

A Content Management System (CMS) is a potentially massive database and also file framework that is designed for archival and retrieval of vast quantities of information. This system of management is required within libraries for their works to preserve & retain an electronic record of educational body like journals, magazines and other tools so that the material can be reused by faculty and students of the organisation through various applications. For the both, website administrators and writers, the Library CMS offers opportunities to them. It sets out specified publishing procedures and unique publishing rights for different persons. These full facilities save users time for preparation, allowing more individuals to access services whenever and anywhere they wish.

Content

Content is knowledge created from the editing process and consequently intended via publication for human society. In particular, content is the certain form or segment of digital information.

Source: Chavan, S.B. (n.d.). Content Management System. Retrieved January, 5, 2021 from https://library.iitd.ac.in/arpit/Week%209-%20Module%203 %20Content%20Management%20System.pdf

It may include data, pictures, illustrations, YouTube clip, speech, transcripts, audio recordings, anything. In other letters, everything which is going to be retained and handled in a digital form.

Content Management

Management of content comprises of the structure and procedures by which information is produced, handled, written, and archived. Over a specified, amount of period information usually goes across such lifecycle.

Content Management System

A CMS is a software suite which offers certain degree of automation for the activities needed to organize information appropriately. Usually, it is a multi-user, server-based programme that also interfaces with saved information in a repository. This archive may be stored over the common network, as component of the same suite of software, or completely in an independent storage location. The Content Management System (CMS) is an existing software application which offers a simple interface for managing data such as text, images, music, documents, etc i.e. digital content.

History of Content Management System

The development of CMS initiated since the 1990s while the website engineers were trying to cope-up with the problem of HTML page to be displayed appropriately. Except the e-commerce sites, the other were static only. The introduction of PHP appears as the opportunity for the administrators of the site as they are now able to modify material on their individual pages. It was the beginning of customized CMS. Hence, this feature of modification enables the managers to share the videos, images, create stories on the web pages that makes it much more pleasurable. The individuals began promoting their CMS and introducing CMS-selling and support service. Over the time

during the year of 2000, the CMS were developed as its another category of software which was the Document management system. These were supported with word-processing applications, spreadsheet applications, presentations etc. These CMS were remained moderately useful during the initial couple of years, however by around 2004, they started another inning and begins to be ready for prime time.

Components of CMS

The two key components of a content management system are as:

Content Management Application (CMA): A Content Management Application (CMA) is a GUI (graphical user interface) that enables its users to build, remove, change and distribute data despite any expertise of the HTML including other scripting languages required for website design.

Content Delivery Application (CDA): For the back-end operations, a content delivery application (CDA) remains fully liable. When content is framed in the CMA, it regulates and distributes information.

Anatomy of a CMS

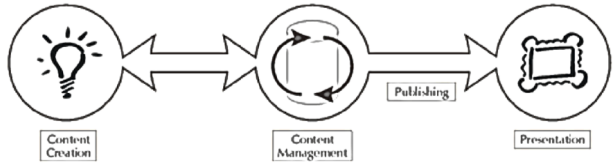
A content management system's functionality can be subdivided into various key segments. They are as:

a. Content Creation

b. Content Management

c. Publishing

d. Presentation



Source: https://studymafia.org/wp-content/uploads/2015/07/mba-content-management-system-Report.pdf

An CMS helps the individual to create a content as per the requirement. It may be article, papers, image etc. After the creation of the content, the content is then categorized, stored and other functions related to it is performed. The content after this step is ready to be published using the various media in the presentation mode as per the need and certain standards of website etc. The CMS manages the entire lifecycle of pages, from creation to archival.

Need of Content Management System

The various need of CMS is as following-

1. To pursue a competitive benefit in creatively utilizing information assets.
2. Networking of multiple clients/ sectors pursuing different knowledge requirements.
3. To consolidate various formal, informal, synchronous and asynchronous knowledge from and with the individual and various technological tools too.
4. This assists anyone who is having difficulties with the amount, reliability or adequacy of the intranet or website information.

Features of CMS

CMS enables administrators to handle electronic content in such a way that it can be offered to individual consumers with the greatest effectiveness The CMS features are as continues to follow:

1. Control Content- It provides authorization for the user that could access as well as make modifications to the document
2. Allow Content Reuse- Once any information is created, it can be used multiple time by just accessing and retrieving the content from any location. It also helps to increase the visibility of the content.
3. Multi- language support- Linguistic support is available in CMS, enabling users to incorporate content into their native tongue.
4. Allow Content Automation and Aggregation- The CMS offers the automation to the content as it makes it easy to access the by the patrons in multiple formats like eBook or pdf else.
5. Increase Editorial Efficiency- The one of the main functions of the CMS is offering the assistance facility to the editors so that they may make available to maximum content to the users in as less time as possible by putting less effort too.
6. Built-in media solution- CMS provides a built-in Media Management Solution that can be utilized to handle photos, music, information, and other media, as well as textual descriptions.
7. Creating content- Various materials are collected from numerous sources and then the created content is makes available to the user for the educational purpose for the sake of society for its betterment.
8. Storing content- The CMS permit with the storage facility so that the information can be stored on that platform. The stored material can be use as per the requirement.

9. Indexing content- The stored material is indexed in a specific manner which enables the categorization and arrangement.
10. Retrieving content- The materials that are contained in any particular CMS platform enabled with the indexing feature and hence the searching techniques are also applicable on them. This encourages to the easy retrieval of the content.
11. Publishing content- There are various standards and formats that to be followed for publishing a content on the internet. The CMS is empowered with such feature.
12. Managing content end-to-end- The problem which is usually faced by the people in the digital environment is information security. The CMS has resolved this problem as it is equipped with the feature to manage the end-to-end content.

These are some major features of the CMS.

Types of Content Management Systems

The content management systems can be broadly categorized in the following type on the basis of the basic functions are as-

1. Web content management (WCM): The WCM works to manage and organize the content for the online content. It is mainly meant for widespread distribution throughout the internet.
2. Enterprise content management (ECM): This is designed by keeping in mind the various aspects of business. Its use and management are limited for a closed group of users and functions performed by them. In general, it is called "document management" which enables the file management, reports, memos, access authorization, employee biodata etc.
3. Digital asset management (DAM): It is responsible for the handling as well as processing of rich digital products such as pictures, voice, and graphics, text, visuals and other media.
4. Records management (RM): The administration of transactional data and other information produced that are result of business activities (e.g., documents of transactions, agreements, authorization, and so on).

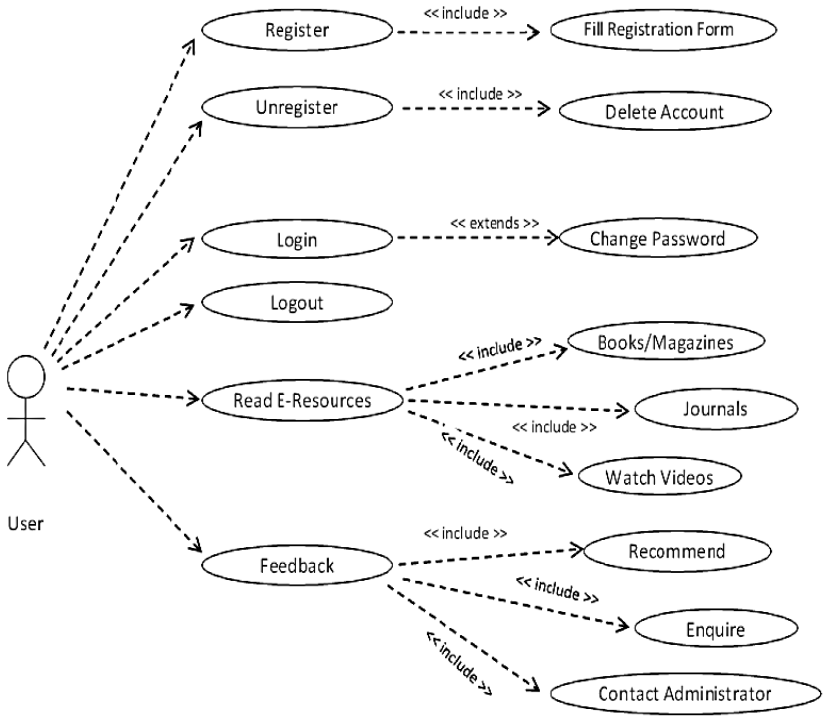
Content Management Systems in Libraries

The Library Content Management System framework is focused on the administration of a library's components and services. It was tailored keeping in mind the various aspects on any library like archiving of information assets

library and its services. A typical library CMS facilitates to run the website of library having blogs, notifications, articles regarding their resources. Storage, searching, retrieval of digitized content is also enabled by that which can be reached without any geographical limitation.

System Architecture

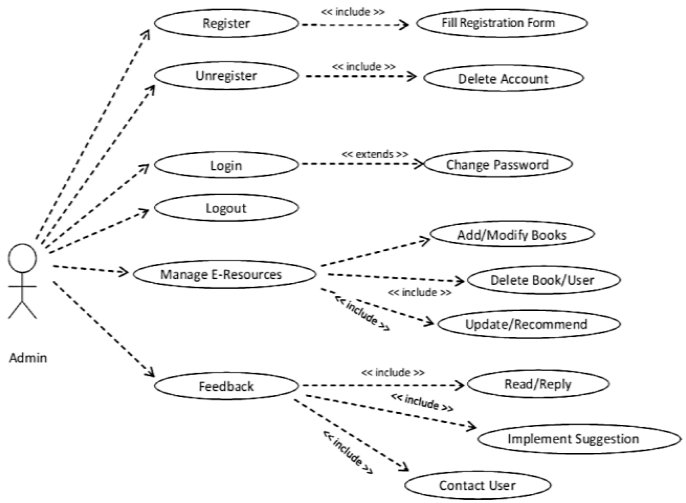
Use Case Diagram: User



Source: Nemade, V., Srivastava, S., Pranav, A., & Nayak, S. (2016). Library Content Management System. *International Journal of Information Technology and Library Science*, 5 (1), 15-26.

Here, the user has to register very first to the facility provided by the administration. After registration, the user may login with their credentials and search for their information or resource whatever is needed by them. The query is match with the CMS and its database and hence finally the result will be visible on the screen.

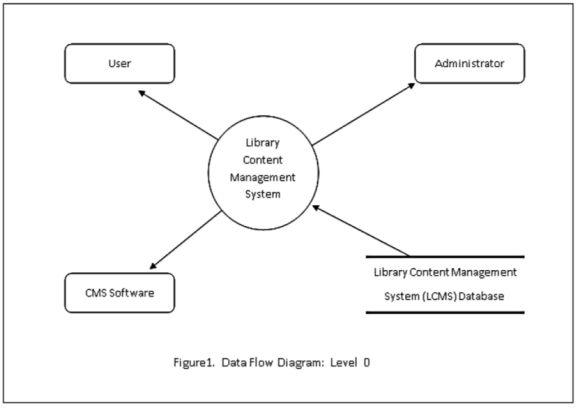
Use Case Diagram: Admin



Source: Nemade, V., Srivastava, S., Pranav, A., & Nayak, S. (2016). Library Content Management System. *International Journal of Information Technology and Library Science*, 5 (1), 15-26.

Under this architecture the role from administration is appear. Here, they register the staff members who serve to the user. They manage the various e-resources and also they read and reply to the feedback of the user. Where ever possible, the suggestions from user are implemented too.

Data Flow Diagram:



Source: Nemade, V., Srivastava, S., Pranav, A., & Nayak, S. (2016). Library Content Management System. *International Journal of Information Technology and Library Science*, 5 (1), 15-26.

The above dataflow diagrams shows that how the Library Content Management System brings together the Library Content management system software and library database to the user and administration.

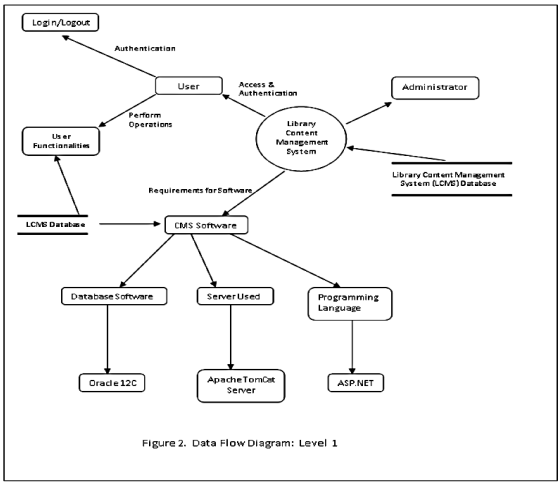


Figure 2. Data Flow Diagram: Level 1

Source: Nemade, V., Srivastava, S., Pranav, A., & Nayak, S. (2016). Library Content Management System. *International Journal of Information Technology and Library Science*, 5 (1), 15-26.

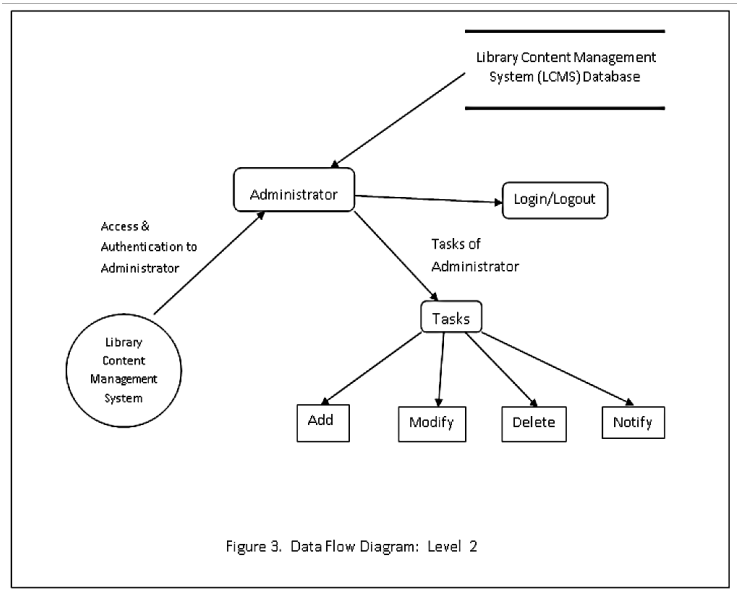


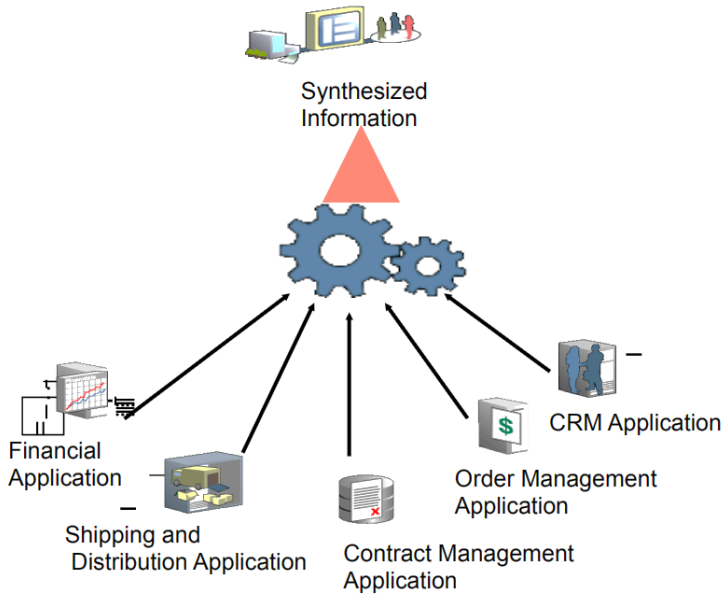
Figure 3. Data Flow Diagram: Level 2

Source: Nemade, V., Srivastava, S., Pranav, A., & Nayak, S. (2016). Library Content Management System. International *Journal of Information Technology and Library Science*, 5 (1), 15-26.

The above two dataflow diagram (figure 2 and figure 3) shows the working of CMS in Libraries.

Data Integration

This is the strategy of assembling information from different platforms in order to provide a single view of all of them and to respond to inquiries with the help of gathered information.



Source: https://web.cs.wpi.edu/~cs561/s12/Lectures/IntegrationOLAP/DataIntegration.pdf

The Integration can be physical or virtual

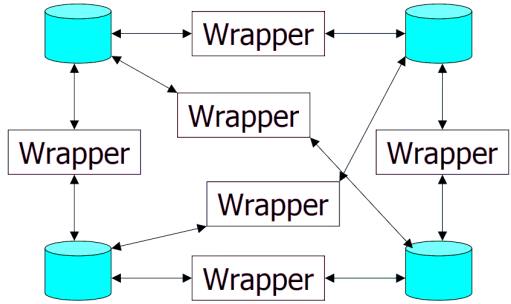
Physical integration: Under this type, there is transferring of relevant information and files to a storage i.e., warehouse.

Virtual integration: In this integration, data can only be maintained at the sources.

Models of Data Integration

1. Federated Databases
2. Data Warehousing
3. Mediation

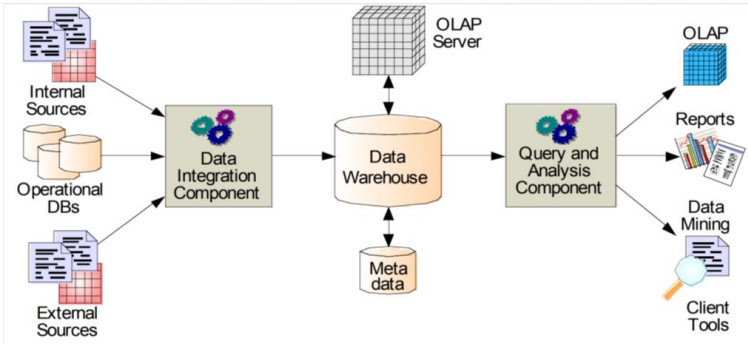
1. Federated Databases



Source: https://web.cs.wpi.edu/~cs561/s12/Lectures/IntegrationOLAP/DataIntegration.pdf

It is the most fundamental structure. Each source pair may create its specific representation and mapping.

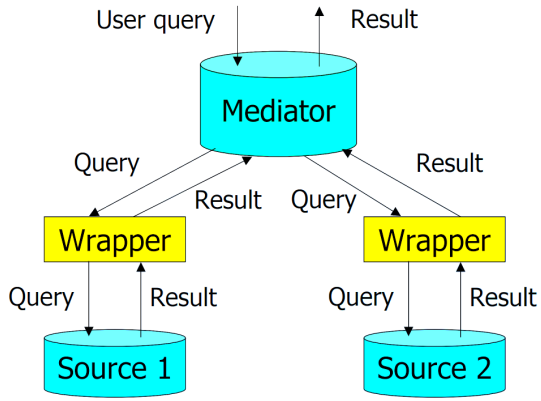
2. Data Warehousing



Source: https://web.cs.wpi.edu/~cs561/s12/Lectures/IntegrationOLAP/DataIntegration.pdf

This is a very popular technique. Information through different sources is extracted and preserved in a warehouse using this process. Information collected is materialized within the warehouse at that destination, and people can look up at the warehouse dataset.

3. Mediation



Source: https://web.cs.wpi.edu/~cs561/s12/Lectures/IntegrationOLAP/DataIntegration.pdf

Mediator is a virtual representation of the data (Does never in itself hold any records). The information is only ever kept at the sources. Mediator uses a synthetic schema that incorporates all of the sources' schemas. In comparison to warehousing, where mapping occurs at the time of uploading, in mediator the mapping occurs at time when it is requested.

Implementation of CMS

A content management system (CMS) can assist the entity in designing and maintaining a webpage, yet still a smartest CMS system won't create a top-notch platform without appropriate implementation. This Content management system planning checklist will guide on the most critical aspects of web site creation for a content management system in order to achieve the prime and most streamlined implementation possible.

Organize a Commission of Oversight

1. Appointment of Executive-At least immediately a high-level supervisor to provide you with management feedback.
2. Section executive- Section Supervisors feedback and resource allocation from departments.
3. IT- Assistance for excellent technical advices and actions in information technology sector.
4. Vendor communicator- Council members should be created who has the responsibility to deals directly with any relevant vendors.
5. Neutral judgement- For a better viewpoint, put in a neutral group that isn't actively engaged in the implementation.
6. Legality- Legal Assistance in ensuring that your new website does not place you in risk of legal action.

Compose A Supporting Squad with The Implementation

1. Project co-ordinator- A project coordinator is a team leader who can interact with a number of people and steer the project forward.
2. IT team- Workers that are responsible for addressing technological problems and implementing systems.
3. Content Developers- Business unit specialists who can create specific CMS blog content.
4. Developer for website- A web developer is someone who has a vision for magnificence architecture and can make the site more impactful and user-friendly.

Prepare a Project Roadmap

1. Proposal- How would one organize your proposal?
2. Backlog- Create a backlog of all the activities which require to be fulfilled.
3. Estimate- Make an educated guess about the certainty for each event will needed to finish.
4. Prediction for initial task- Accurately predict whichever steps are crucial to excellence, then after identifying prioritize them for initial stage.
5. Objectiveness- Show the appropriate objectives of your CMS implementation project by defining the spectrum.
6. Contact with stakeholders- Decide about when, with whom and why you'll connect with the stakeholders of the project.
7. Tracking progress- Agree on how to keep track of the project and monitoring.

Make a Timeline for applying the CMS

1. Estimation- When would you must get the whole proposal finished?
2. Initiation- When will work on the CMS implementation initiate?
3. Milestones- What big tasks must be accomplished by those dates in order to remain on schedule?
4. Informed member- Distribute the planning framework to all members who are actively or in any manner involved in the implementation task.
5. Scheduling- Fill your calendar with grouped, prioritized activities until you've used up all of your available time.
6. Re-evaluate- If there are any activities that still does not work out as planned or any further need of modification.

Establish a Content Management Strategy

1. Who will have access to the new site's content creation?
2. What are the design criteria that content developers would conform to?

3. What kind of material is suitable (or otherwise not reasonable) for the site?
4. Photos- What kinds of images will be used on your blog, and where will they come from?
5. Additional Feature- What and which feature like social media features will be integrate into webpage.

Implementation of the Content Management System

1. Examine- Should the framework perform as expected?
2. Develop on the CMS base by completing other tasks in the order of priority.
3. Test- Is your site running properly and looking the way you want it to?
4. Monitor progress- Interact also with execution team on a frequent basis to ensure whether everything remain on route.
5. Induction- Ensure training for that admin people so that they can effectively use the latest CMS.
6. Report- Consult with the advisory board on a regular basis to report progress and receive input.
7. Redefine- Reframe and make the adjustment whichever is suitable for in favour of the task.

Criteria for Selecting a CMS

It is a difficult task to choose a CMS as it is a long and budgetary process. It will be very difficult to implement any other system in future. Therefore, careful and thoughtful steps should must be taken while taking the decision to select a CMS. For successfully completion of this task, one should be very clear with their objectives and their specific requirements. They may be as:

1. Functionality- The chief benefit of the CMS is that is allows the administrators to edit the content to be mentioned on their website as per their needs. Therefore, the editing feature should be facilitated by that system.
2. Editor- Make sure the editor is fulfilling the checklist of specifications required to achieve the objective. External materials, such as photographs and files, should also be managed by the editor.
3. Content interoperability- Notice the manner in which the content management system treats PDFs, Word documents, and other similar nature documents while downloading and adding them. How are they then viewed to users, and how do they communicate with them? What kinds of definitions can be added to the files, and can the search index them?

4. Browsing- What are the various searching feature are enabled in the CMS that will help easy searching and improve user experience.
5. Feedback- For the continuous improvement there is need of user review. If the CMS allows the user to drop their views, it will be more beneficial.
6. Administration- The allocation facility for role of various administrators to avoid future conflicts and proper management.
7. Security- Security of information in the modern age is the most distressing and important aspect. For a good CMS it is important that is has focus on the same.
8. Versioning- It should be able to incorporate with the various versions which will increase its efficiency too.

Evaluation of Content Management System

The following are the numerous check points for CMS assessment which must be taken into consideration:

Content Management

- Very first the editing feature like attachment of different type of digital objects are permissible and how it is managing them.
- The interface is how smooth and comfortable for the administrators in all manners.
- Interoperability and version adaptation is also taken into consideration.

Integration

- Does the CMS is able to incorporate and work efficiently when collaborate with the third-party application and platforms

Publishing

In this aspect, the following is to be observed that-

- Does the system offer drafting facility for any content prior to making it available to public?
- Does it offer publishing on multiple platforms on the web?
- The published content are views as the same as it was designed?
- Is it possible to modify and withdraw previously posted sections?

Managerial Aspect

- The evaluation should also be done on the basis of its managerial aspect that whether is offering role assignment for various task and authenticate them.
- The CMS should also enable with the various analytical packages for generation of statistical report and uses analysis.

Categorization

- Under this aspect is it the focal point of the observation that the CMS offers the categorical criteria for the content and also the management of information at front-end and back-end.

Add-ons

- The add-ons are the small patches that is needed when some extra feature is to be implemented. Is there is any extension plan is incorporated in that particular setup and also if it available, then it is chargeable or not.
- Also, what kind of choices are there to help the marketing approach?

Infrastructure

- System requirement are the most important aspect. As this is the hardware requirement that will only a medium to work using the appropriate software.
- IT techniques and information security concern are the part of the evaluation of the CMS.
- Technical Assistance- In case of any difficulty faced by the administrators then if there will be any assistance available regarding them from vendor-end. Special attention should be given on the various terms and criteria related to it.
- These are the key factors to consider when evaluating a Content Management System.

Popular Content Management System

CMS	**Open source**	
		WordPress
		Joomla
		Drupal
		TYPO3
		Concrete5
		Django CMS
		GravCMS
		OpenCMS
		OpenWGA
		C1 CMS
	Proprietary	
		Microsoft SharePoint
		IBM Enterprise Content Management
		Pulse CMS
		Sitecore
		Shopify
		Kentico

Advantages of CMS

The CMS is enabled with the following advantages-

1. It offers the content online which were earlier available in hard copy hence also taking initiative towards green environment.
2. They are updated time to time for introduction of new features and security patches.
3. It facilitates the storage and preservation of content for future use.
4. Offers searching to various content using various techniques of searching.
5. Enable the editors or administrators to public maximum content on the website in very less efforts.
6. A content management system (CMS) greatly decreases the expenditures of online data management.
7. All the CMS are fulfilled with some criteria and standards of the publishing etc.
8. An CMS helps to organize the website that will be helpful for the visitors of the site to navigate easily.
9. CMS kept the track record of the various tasks for further review by itself or audit team.
10. It manages end-to-end encryption for the shared information between the administrator and the user which promote to their trust level and hence the image of the library too.
11. With the help of them the authorization and authentication are possible for delivering content access to user group in a secure way
12. It imparts the ability to handle clients with various duties and access controls.
13. The one of its chief advantages is its ability of repurposing the content. Under this, the same content can be served in various formats so that they are now useful for the normal users as well as disabled people too.

These were the chief advantages of CMS.

Limitations of CMS

In spite of so much advantage, nothing is perfect on the planet. The limitations of CMS are-

1. CMS software requires frequent updates, so the user must keep an eye on towards new versions.
2. The use of numerous plugins will start making your site dense and difficult to maintain.

3. It cannot write its content at their own.
4. These were the few major limitations of a CMS that are encountered.

Conclusion

A Content Management System (CMS) is a software program that helps to administer the information on your webpage It lists all of an institution's records. Members of user community can afterward choose keywords to browse for information, which is extracted by the CMS framework and show as the result of query. The Library Content Management program which is basically a Web Content Management System will encourage readers to annotate, interpret, review, and exchange material by digitizing and archiving newspapers, video streaming, and similar content. It can index or arrange content, catalogue it in real time, or deliver information to specific users in a format prescribed, such as in any language, format etc.

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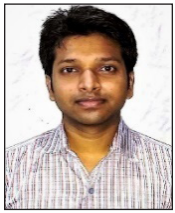
About the Authors…



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Content Management System: A Study on Joomla and Drupal

Ekta Gupta

Abstract

The mechanism of service delivery evolved from offline to online with the emergence of the internet, and networks have become medium for speedy access and implementation of services in libraries. Content Management refers to the effective management of identified digital information by combining rules, processes, and workflows in such a way that authors and editors can easily create, modify, and publish this information. Open-source software is fairly common in the field of library and information science because of its ease of use. This study aims to raise library users' understanding of Open-Source Content Management Systems (CMS) and their benefits in offering better services. The study focused on two open-source CMSs, i.e., Drupal and Joomla; and will emphasize on their installation, features, components and advantages.

Keywords: *Content Management, Content Management Software, Joomla, Drupal.*

Introduction

We are living in the information age. In today's informed society, there is absolute change in the generation, distribution, and access to information. The amount of information on the internet is increasing rapidly, and searching on the internet today has created a new set of problems for site administrators. The term "content" usually refers to the ideas and views presented in a text about a subject or theme. It could be explanatory, descriptive, investigative, evaluating the advantages and disadvantages of a specific collection of ideas or a phenomenon, creative, or imaginative. A unit or category of digital

information in today's environment is content that is arranged in an electronic way. It was becoming increasingly difficult to create and manage content on websites (Gupta et al., 2020). Thus, the need for a Content Management System (CMS) has arisen to manage, produce and distribute different types of content. A library's website is its virtual branch and vitally important to the functioning of the library. The administration of the library is an important component that should be managed appropriately. A CMS is now essential in all libraries in order to provide a single platform for accessing all resources. The CMS can help librarians collect, organize, store, and deliver resources in an efficient manner to the users. It helps the user to have access to information from anywhere at any time.

The majorities of CMS are built on the LAMP (Linux Apache MySQL PHP) stack/technology and are FOSS (Free Open-Source Software.) Every CMS now makes use of downloadable modules or extensions. Modules allow the community and other third-party developers to extend the capability beyond the original content (Giri & Kirti, 2009). There are many CMS popular among users; like Joomla, Wordpress, Drupal, Mambo, Silver Stripe etc.; but the work presented here deals only with the study of Joomla and Drupal.

Open-Source Software

The term "open-source software" was coined as part of a free software marketing campaign. Open-Source Software (OSS) is a kind of software that can be freely used, changed, modified, improved and shared by anyone. In this sense, open source is a kind of peer review which is used to strengthen the progress of scholarly communication. It has revolutionized the development of software and offers a number of attractions for libraries, especially those which are functioning in developing countries. The OSSs, which are mostly compared with user generated content, are the most outstanding examples of open-source development.

Content Management System

The term "content" refers to any unit of digital information. It could be text, images, graphics, animations, messages, video, audio, or something else. In other words, digital information encompasses everything that can be made available via the Internet or Intranet.

Muthuraj & Rajkumar (2018) defined Content Management as a process of generating, collecting, categorizing and structuring information resources of any type or format so that they can be saved, retrieved, published, updated and reusable in any desirable way. Any means used to manage and/or create content and update the websites is known as Content Management System

(CMS). CMS is a server-based program that stores web pages and distributes every detail in a database rather than as HTML pages.

Content Management System is a type of software that enables any organization to create, edit, review and publish the electronic text. As per the definition given in Wikipedia, "A content management system (or CMS) is a software program that organizes and facilitates the creation of collaborative content. The phrase has recently become almost totally connected with applications for managing website content. These programs are sometimes known as Web Content Management (WCM)". A content management system (CMS) is a computer application that allows several users to work together in a collaborative environment to create and modify digital material using a common user interface (Vivekavardhan & Verma, 2016).

Thus, CMS is software that is used by different skilled and non skilled staff for designing, updating, translating, distributing and maintaining digital information. Image files, audio files, electronic documents, and web resources are all part of content management systems. With the advent of Web 2.0 technologies the functioning becomes more flexible and easier than the traditional technologies.

Content Management is an unavoidable tool for libraries and information centers to improve the accuracy and timeliness of information, reduce duplication, increase sharing, support the growth of databases and websites, and provide new services to users. Web content management (WCM), document management systems (DMS), and enterprise content management (ECM) systems are examples of content management systems.

Features of Content Management Systems

According to Kirtania et al. (2015), there are three kinds of services accessible in Content Management Systems. These are the primary, design, and optional features:

Primary Features

1. Help that is both integrated and available online
2. Extensible and modular
3. Management of users and groups is simple.
4. Permissions system based on groups.
5. Full template support allows you to create endless appearances without changing a single line of content.
6. Installation and upgrade processes are simple.
7. Multiple language support in the administration panel
8. Content with unlimited depth and size in a hierarchical structure
9. File manager built-in

10. Integrated audit log
11. Takes up less space

Design Features

12. CSS and XHTML compatible
13. Automatically produced menu
14. Every page can have a unique theme
15. Design obscured from content editors.
16. On a single page, there are multiple content regions.

Optional Features

17. Search
18. Polls
19. News
20. Blog
21. Newsletter
22. Schedule Calendar
23. File Uploading
24. Glossary
25. Forms
26. User Management
27. Guestbook
28. Google Sitemap

Objectives

The primary goals of this paper are as follows:

1. To provide an overview of content management systems (CMSs) and their features.
2. To underline the technical needs, features, and functions of both Joomla and Drupal software.
3. To compare the features and functionalities of both CMSs, on the basis of various criteria.

Methodology

This paper is based on literature given in Journals available online in the public domain. For this paper, the researchers studied numerous articles, online encyclopedias, and user's manual guides available for both of the software's. The study has been presented by comparing and by preparing tabulation, based on different criteria, of the selected open-source management software such as Drupal and Joomla.

Limitations of the Study

The Content Management System is available globally, but the present study is confined to the overview and features of the Content Management System. The study is confined only to two CMS software's i.e., Joomla and Drupal.

JOOMLA

Joomla, which means "all together" or "as a whole," is one of the most popular freely available open-source content management systems (CMS) for website publishing. It was founded on 17 August 2005 by Open-Source Matters, Inc. (wikipedia.org/wiki/Joomla). For its application, it uses object-oriented programming (OOP) techniques and generates a web application system for model-view-controller (MVC). Joomla is designed using PHP, MySQL for data storage and various design tools.

Joomla is capable of developing websites of all types and sizes. The main objective is to design corporate websites or portals, corporate extranets and intranets, online newspapers and magazines, websites for e-commerce, government applications, libraries, and websites for institutions, community-based portals, and homepages for individuals or organizations (www.tutorialspoint.com/*Joomla*/*Joomla*_overview.htm). Since 2005 until now, Joomla has released several versions and the new version (Joomla 3.9.28), which was released on July 6, 2021(wikipedia.org/wiki/Joomla).

1. Installation and Hosting

For the use of the Joomla website on the Internet, a web account is necessary. The demo site can be used on web servers for 90 days free of charge. The site may be used for testing or playing with the Joomla installation (www.demo.Joomla.org). Joomla provides the hosting companies a fast and simple 'one click' installation. The critical requirements for its installation are a dedicated server, a shared server hosting plan and a computer for testing or development.

2. Extensions

The output of a Joomla website can be expanded by software packages for extensions. Components, languages, modules, models, plug-ins, repositories, files and packages can be divided into eight categories of extensions. Specific functions can be regulated by these extensions. The Joomla Community-built extensions are not free but require a minimum download fee.

3. Components

In Joomla, the most complex and largest extensions of all forms are components. They behave like mini-apps. It is divided into two parts: a site component that allows users to view the site's front end, and an administrator element that allows the site administrator to change material and do technical

tasks. The aim of the component is to send the main body to the loaded page each time. Menu items operate the key portion of websites and each menu item runs a component of Joomla.

4. Plug-Ins

Plug-ins is advanced extensions which function as Joomla's event handlers. An event may be triggered for the implementation of Joomla's pieces, a module or component. Whenever an event is enabled, the plug-ins is scheduled to be run by the application to handle the event. Often, even if they don't necessarily include huge portions of a web, large or advanced plug-ins are called components.

5. Template

The primary architecture of a Joomla website is explained by a template. To accomplish this purpose, the web designer helps to adjust the appearance of a website and the prototype is used. The template provides the style of the sites with versatility. It is of two kinds: it is the duty of the front-end template to monitor and display the website content for user viewing. The back-end template manages the website's administrative assignments and management functions.

6. Modules

Modules are adaptable plug-ins used to interpret a page on a website. The boxes arranged around a part called modules are called. The login module is the most common example. It is possible for users to select any module from the menu items (show or hide). It is noted that in essence, modules do not need to be connected to components. Presently, it can be text or static HTML.

7. Languages

One of the simple and essential categories of extensions is the Joomla language. They can be as a core package or as a package of extensions. The packages have two forms, the website and the administrator. Also included in the language packs is an XML Meta file that describes the language and font details used to produce PDF content.

8. Libraries

Extra php is commonly used to help boost performance and function for a component, module or plug-in. Google is one of the best examples of this.

9. Files

It's possible to mount single files anywhere on the Joomla file system. Providing additional prototype views is an example for extension developers.

10. Packages

It Allows the user to add extension combinations. You can quickly install or uninstall the relevant packages at one time, rather than part by part. The following figure defines Joomla's structure:

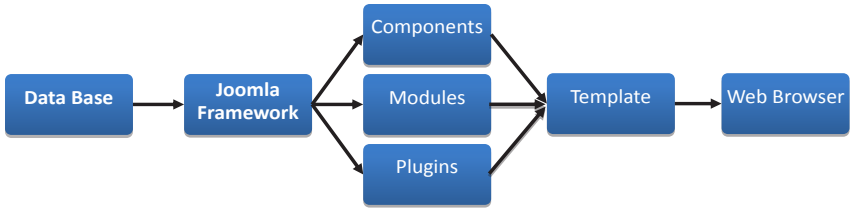

Figure 1: The Structure of Joomla.

Features of Joomla

1. User Manager - User Manager that processes user information, such as editing, posting, modifying passwords and language access permissions.
2. Menu Manager - The items can be generated and handled properly by the menu manager. In various types and in many locations, the menu can be easily decided.
3. Content Manager - The content manager uses the WYSIWYG editor in a very easy way to create or edit the content.
4. Media Manager – It can quickly upload, organize and manage media files and directories in the article editor tool.
5. Contact Manager-Contact information for individual users can be easily modified and handled.
6. Web Link Manager − Links are given for site users and classified into various categories.
7. Banner Manager– The banner manager can easily add or edit the banners.
8. Template Manager– With the aid of the template manager, the designs are handled on the website.
9. Web Link Manager − Links are given for site users and classified into various categories.
10. Search - Users can quickly search the web for suitable details. Better search options are provided in Joomla, such as indexing, advanced searching, auto recommendation searching, etc.

It is an open source and publicly usable forum for all. The models are versatile to use. Both browsers are compliant with it. Joomla assured us of data content protection.

Drupal

Drupal is a free and open-source Content Management System for organizing, maintaining, and publishing website content (CMS). It's built on a

PHP-based platform. This is licensed under the GNU General Public License. Its slogan is "come for the code, stay for the community", which implies that everyone has the right to download it and share it with others. Dries Buytaert began it in 1999. A community of over 1,000,000 users and developers created and maintains it. An open-source content management system was created in 2001(www.wikimatrix.org/show/Drupal-wiki).

In the administration system, only the raw elements required for the creation of a website are provided. Successful device usage implies a strong understanding of programming and a clear view of design is important.

After twenty years of the first launch of Drupal which took place in January 2001, its new (stable) update, Drupal 9.1.6, was announced recently on 07 April 2021 (wikipedia.org/wiki/*Drupal*).

1. Installation & Hosting: The installation process for Drupal is quick and fast and the hosting companies provide 'one-click installation'. No programming skills are required for the development of web site installation and administration. It can be created either automatically from a user's hosting account administration page or manually through a (FTP) file transfer protocol.

2. Drupal Core Extension: Users can benefit from Drupal's core capabilities, such as blogging, forums, and communication forms, and it can be simply expanded by installing other modules and themes. It is necessary to download the core files in order to establish a website. In order to start a site, there are several modules and themes required. To extend the output of websites, installation modules, themes and translation profiles are used.

3. Modules: A module is a collection of PHP, JavaScript, and CSS files that add functionality and extend site features. The modules have features such as galleries of images, styles and listings of custom content, WYSIWYG editors, private messaging, etc. Content Construction Kit (CCK) and Panels are the most widely used modules in Drupal.

4. Themes: Themes may be used to modify a website's appearance. For those willing to build a strong website, Drupal is a great platform. A web designer designs themes and shares them in the public domain. The theme describes the website's HTML markup and CSS styling that wraps up the content. The theme can be used to modify the look of an entire site, but it can also be used to change the look of certain portions of a site, such as individual pages and content styles.

5. Distribution: Distributions provide a particular category of site with characteristics and functions. It consists of applications, modules, themes, predefined setup, profiles and libraries for installation. It consists of two types: full-feature distributions - a complete solution for specialized purposes such as research, governmental, publishing and social use. Certain distributions - these are the starting points for website developers and site builders. Drupal

supports the structure of Presentation Abstraction Control (PAC), which can be described using the following diagrams.

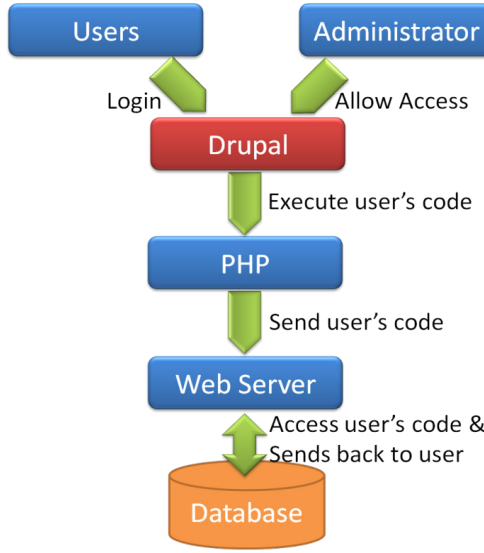

Figure 2: The Structure of Drupal.

Features

- Drupal is open-source software with no licensing costs expected.
- It makes the site easy to build and maintain. The website is inventive, versatile and attracts people.
- User Interface allows the user in the framework to translate something.
- It offers vast numbers of themes that help to build unique themes according to user requirements for the creation of more web applications.
- Drupal is a versatile CMS that assigns text, video, audio, menu items and real-time statistics to the handling of content types. It allows the content to be organized, structured, and reconstructed. It offers interesting themes and models, giving an enticing look to the website. Since Drupal is open source, a lot of new content can be produced for the website.

Comparative Study of Joomla and Drupal

A comparative study has been carried out among two open source content management software i.e., Joomla and Drupal on their various parameters proposed by Das (2017) and Shivakumar & Kemparaju (2017).

Table 1: Comparison between Joomla and Drupal on the basis of parameters of Content Management System (CMS).

Sl. No.	Parameters of CMS	Joomla	Drupal
1	About	It enables us to build websites and online applications. For websites, blogs, intranets, and mobile applications, it's simple to use, build, organize, manage, and publish content.	It is flexible, powerful for building large and complex sites. It is used to make many of the websites and applications you use every day.
2	Released Year	17 August 2005	January 15, 2001.
3	Developer	Open Source Matters, Inc. and the *Joomla* community	Dries Buytaert and *Drupal* community
4	Operating System	Unix-like, Windows	Unix-like, Windows
5	Repository	github.com/*Joomla*/*Joomla*-cms	*Drupal* Repository
6	Website	www.*Joomla*.org	www.*Drupal*.org
7	Written in	PHP	PHP, using Symfony
8	Type of CMS	Web Content Management (WCM) System, Content Management Framework.	Web Content Management (WCM) System, Content Management Framework.
9	License	GPL Ver.2.0	GPL Ver.2.0
10	Latest version	3.9.27	9.1.8
11	Required Memory	256 MB	32 MB
12	Database	MySQL	MySQL, PostgreSQL, MS-SQL.
13	Server	Apache Web Server	Apache Web Server
14	Installation time	One click or 10 min. manual	One click or 10 min. manual
15	Update frequency	36 days	27 days
16	Available Plug-ins	7905+	38238+
17	Free themes & templates	900+	2900+
18	Market Share	7.1%	4.7%
19	Level of Security	Strongly secure	Very Good
20	Mainly used for	Blogging site, educational site, corporate site, personal site, Social networking, Wikis, polling and Online Documentation	Document management, help in sharing social networking opportunities, Wikis, polling, Online support.
21	Browser support	Chrome, Firefox, Internet Explorer	Chrome, Firefox, Internet Explorer, Safari, Lynx, Opera.

Sl. No.	Parameters of CMS	Joomla	Drupal
22	Usage	It is an award winning CMS, enabling us to build powerful websites. It is beginner friendly for users.	It is a content management platform powering millions of websites. It requires coding skills for users to maintain websites.
23	Skill needed	Require some technical assistance.	Requires a high level of technical expertise.
24	Performance	Needs modification to avoid quick resource consumption.	Loads more quickly with faster response times.
25	Best features	Highly dependable, user-friendly, and simple to use CMS for creating websites.	Extension architecture and CMS with a lot of power, Mid-Height end level CMS
26	Extensions	Components, modules & plug-ins	Modules & Blocks
27	Modules	Help in Library Specification	Help in Library Specification
28	Newsletter creator	Mailchimp	Mailchimp

From the above Table 1 we inferred that Joomla and Drupal are open-sources which can be downloaded easily from official websites, and can be installed by one click on the user's system. The resources which are required are a database and a hosting provider only. The operating system, language, types of CMS, installation time, newsletter creator and server are the same for both of the systems. When it comes to databases, Joomla only supports MySQL, whereas Drupal can work with MySQL, Postgresql, and MS-SQL Server. It has been observed that Drupal has been updated to version 9.1.8 and Joomla 3.9.27 with new modules, free themes, plug-ins, extensions and extended level of security. Joomla is the most user-friendly CMS, with a greater range of features. It also boasted the most engaged and largest user community. Drupal was the most challenging to operate, but it appeared to be the most reliable in terms of security and user roles. Many Joomla and Drupal features are available in the dashboard menus (home pages of Joomla and Drupal) (www.diffen.com/difference/Drupal_vs_Joomla).

We may deduce from Table 1 that all of Joomla's and Drupal's added features are nearly identical. Social networking is not a basic feature of Joomla or Drupal, but it may be added with the help of an add-on module. Wikis are a key element of Joomla; however we can add this module to Drupal (www.

guru99.com/*Joomla*-vs-wordpress-vs-*Drupal*.html). Furthermore, expanding Drupal's capabilities is more difficult than extending Joomla's because certain functionality may rely on other libraries or functions, making the extension process lengthy and inconvenient.

The comparative study between Joomla and Drupal provides information about various features for selecting the platform for developing websites. The present study shows that the content management systems are more compatible with each other from various perspectives of needs and development.

Conclusion

The Content Management Systems (CMSs) have evolved into an indispensable tool in our everyday life. CMS offer a versatile way to use, display and manage content online. Joomla and Drupal are the most efficient Content Management Systems because they have the best installation and documentation support. Each Content Management System has its own merits and demerits. CMS is based on a set of criteria. Without any prior knowledge of web building technology, librarians can pick which option is ideal for creating a resource page for their liaison groups. The study helps librarians to access the features and comparative analysis of two most user-friendly CMS. Librarians will get an insight to decide which is best suited to their library's needs with the help of information given in this paper.

According to the study, CMS technology will remain cutting-edge in the next few years, with a focus on developing customized security solutions for prevention, detection, and recovery on this type of platform. Further study into Content Management Systems enables the display of content in many languages, potentially allowing users to access it in their own language.

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